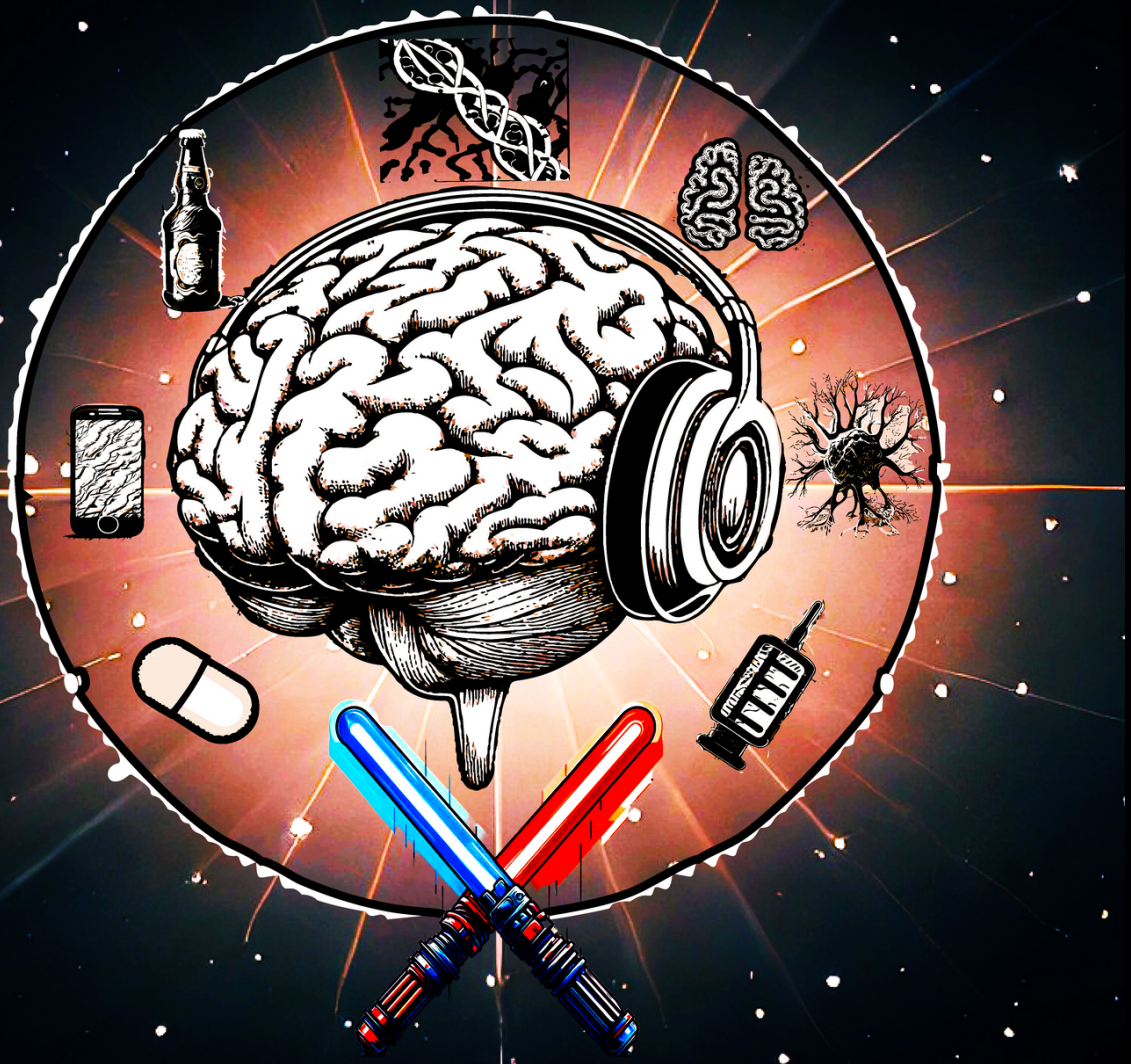
AWAKEN THE FORCE.....



36TH TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
GRADUATE SCHOOL OF BIOMEDICAL SCIENCES

STUDENT RESEARCH WEEK

BRAIN WARS

MAY THE NEURONS BE WITH YOU

FEBRUARY 28TH- MARCH 1ST, 2024

The Graduate School of Biomedical Sciences 2024 Student Research Week Committee:
Executive Directors: Neha Sawant and Praneetha Panthagani
Vice Director of Poster Co-ordination: Robert C Barnes
Committee members for Poster Competition: Naresh Sah and Ganesh Acharya
Vice Director of Operations & Judging: Manikantha Dunna
Committee members for Operations and Judging: Tanima Sharker and Philip S. Antwi-Adjei
Vice Director of Marketing: Megan Skains
Committee members for Marketing: Kerri (Spontarelli) Fruit, Abdul Althaf Shaik and Amanda Kristine Garcia
Website design and maintenance: Danny Boren, Graduate School of Biomedical Sciences
Communications and social media: Rachael Lee and Carleigh Smith, Office of Research; Ashlee Rigsby, Graduate School of Biomedical Sciences
Speaker arrangements: Debbie Martinez, Graduate School of Biomedical Sciences
Abstract book design: Ashlee Rigsby, Graduate School of Biomedical Sciences
Student Research Week Banquet: Tran Nghi (Skylar) and Kerri (Spontarelli) Fruit, Graduate School of Biomedical Sciences Graduate Student Association

The 2024 Student Research Week Committee would like to extend their warmest thanks to the following for their contributions and support in making Student Research Week a great success this year:

- *The Graduate School of Biomedical Sciences staff: Leslie Fowler, Ashlee Rigsby, Pam Johnson, Debbie Martinez, Tres Boren, Kari Dickson and Dr. Brandt Schneider*
- *Office of Communication and Marketing: Suzanna Cisneros, Kelly Podzemny, TR Castillo, Mark Hendricks, Ashley Hamm, and Marcie Aultman*
- *Office of Institutional Advancement: Jordan Nabers and Helen Li*
- *Student Life: Deidra Satterwhite*
- *President's Office: Bryce Looney and Coleman Johnson*
- *Provost's Office: Nancy Martin, Roman Ramirez, and Ashlee Dickerson*
- *Chancellor's Office: Dede Kirkpatrick, Scott Lacefield, and Amanda Castro-Crist*
- *SOM Office of the Dean: Charity Donaldson*
- *The departments of immunology and molecular microbiology, cell biology and biochemistry, pharmacology and neuroscience, cell physiology and molecular biophysics, medical education and graduate medical education; Center for Membrane Protein Research (CMPR)*
- *Graduate School of Biomedical Sciences at Lubbock, Abilene, and Amarillo, the School of Medicine, the School of Nursing, the School of Health Professions, the School of Pharmacy, the Office of Interprofessional Education, Internal Medicine, Orthopaedic Surgery, Obstetrics and Gynecology and Texas Tech University.*
- *Dr. Beverly Chilton for establishing the Bette B. Chilton scholarship in honor of her mother.*

We also are very grateful to all the TTUHSC faculty and staff for their guidance and support.

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TTUHSC
BIOMEDICAL SCIENCES

Greetings:

It is my great pleasure to welcome everyone to the 2024 Graduate School of Biomedical Sciences Student Research Week on February 28th -March 1st. The theme for this year's event is "Brain Wars: May the Neurons be with You," and we are very pleased to host three highly distinguished keynote speakers: Dr. George Koob, PhD, the Director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA); Dr. George Perry, PhD, a Semmes Foundation Distinguished University Chair in Neurobiology at The University of Texas at San Antonio; and Dr. Allan Basbaum, PhD, Chair of the Department of Anatomy at the University of California, San Francisco.

I am extremely indebted to the 2024 Student Research Week Organizing Committee: Praneetha Panthagani (Co-Director), Neha Sawant (Co-Director), Megan Skains (Vice-Director of Marketing), Robert Barnes (Vice-Director of Poster Coordination), Manikantha Dunna (Vice-Director of Operations), Nghi Tran (GSA President), and Kerri Spontarelli (GSA Vice-President). They have all done a tremendous job! I am particularly grateful for the hard work and assistance from Pam Johnson, Kari Dickson, Leslie Fowler, Ashlee Rigsby, Debbie Martinez, Tres Boren, and the faculty and staff of the Department of Neuroscience and Pharmacology. Also special thanks to the host department chair, Dr. Neugebauer, and to Dr. Jones for coordinating activities with the School of Medicine. The GSBS faculty, staff, and students make Student Research Week a success year after year. Finally, I would like to thank Chancellor Mitchell, President Rice-Spearman, Provost D'Agostino, Senior Vice-President for Research McMahon, and Drs. Prien, Dufour, Weiner, Siddiqui, Abbruscato, Srivastava, Shurmur, and Chilton for their support that has made this event possible. Thanks also to our many donors and supporters who have helped make this event possible.

To help celebrate the 36th Student Research Week, the GSBS, the GSA, and the Department of Neuroscience and Pharmacology are very excited to host a dinner and evening at the Spirit Ranch. Funds raised from donations and a silent auction that evening will be used to support student scholarships. Thanks to all donors for their help in making this special event possible.

This year we have a special IPE session entitled "FOMO Sapiens: Cutting through the noise in an Age of Excess" featuring an excellent IPE panel: Dr. Jay Killough, Dr. Bryan McLaughlin, Dr. Jeremy Bailoo, and Dr. Joy Osaji. Please join me in thanking them for sharing their time and expertise.

Every year, the GSBS Student Research Week is a wonderful opportunity to meet our students, learn about their work, and discuss research in general. Thanks to the students, faculty and staff for participating.

Let's greet all of our speakers with a warm TTUHSC welcome!

Thanks much and all the best

Brandt L Schneider
Dean of the Graduate School of Biomedical Sciences

On behalf of the organizing committee of Student Research Week (SRW), we extend a warm welcome to the 36th annual Student Research Week 2024. This year's theme is "Brain Wars: May the neurons be with you." SRW is a yearly event coordinated and organized by dedicated student volunteers from the Graduate School of Biomedical Science (GSBS) at the Texas Tech University Health Sciences Center (TTUHSC), Lubbock Campus. SRW is an incredible event that brings together students from various TTUHSC and TTU campuses, and gives them the opportunity to present their research. Participants can meet with distinguished keynote speakers, network with other students, and win awards. This year's theme, "Brain Wars: May the neurons be with you.", draws parallels between the dynamics of Star Wars and a functional nervous system which relies on two indispensable forces: excitation and inhibition. Striking a delicate balance between these neural forces is crucial for maintaining healthy cognition and behavior. Any deviation from this equilibrium can be indicative of disease, potentially leading to disorders. The Brain Wars theme not only highlights neurological disorders but also serves as a platform for an intellectual battleground, where students from various disciplines partake in friendly competition, exchange ideas and foster collaborations. SRW platform also encourages the convergence of diverse perspectives and expertise, reflecting the multifaceted nature of research in biological sciences. The keynote speakers for this year are distinguished in their respective areas of research, which constitute the major fields of research in the Department of Neuroscience and Pharmacology at TTUHSC spanning across areas such as alcohol use disorder, Alzheimer's disease, and pain among others.

Our first speaker, Dr. George Koob is set to commence SRW 2024 with his talk titled "What is Addiction?: A Heuristic Neurobiological Perspective" on Wednesday, February 28th, from 8:30 to 9:30 am via Zoom. Dr. George F. Koob is the Director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and serves as a Senior Investigator in the Intramural Research Program of the National Institute on Drug Abuse, where he directs the Neurobiology of Addiction Laboratory in the Integrative Neurosciences Research Branch. His expertise lies in unraveling the neurocircuitry associated with the acute reinforcing effects of alcohol and drugs. The allostatic model of addiction proposed by him focuses on the neuroadaptations of reward and stress circuits in the development of use disorder, which is a gold standard for most researchers in the field of addiction. Dr. Koob has authored over 800 peer-reviewed papers, mentored numerous students and fellows, and written several books, including "Neurobiology of Addiction." He earned his Ph.D. in Behavioral Physiology from Johns Hopkins University in 1972, followed by post-doctoral studies at the Walter Reed Army Institute of Research and the University of Cambridge (England). His professional journey includes positions at The Salk Institute and The Scripps Research Institute. Dr. Koob's outstanding contributions have been recognized with numerous honors, including membership in the National Academy of Medicine (USA) and the award of the Legion of Honor (France).

(continued on next page)

Our next speaker, Dr. George Perry, an eminent researcher in the field of Alzheimer's disease research. Dr. Perry is a Professor of Neuroscience, Developmental and Regenerative Biology, and Chemistry at The University of Texas at San Antonio, where he previously served as the Dean of Sciences. He will deliver a seminar titled "Mitochondria at the Center of Synaptic and Oxidative Abnormalities in Alzheimer's Disease." Since 1982, he has been at the forefront of Alzheimer's disease research, making significant breakthroughs in understanding oxidative stress and metabolic/mitochondrial dysfunction. Contrary to widely accepted beliefs, his work suggests that amyloid may play the role of a protective antioxidant in Alzheimer's. Dr. Perry's impact is evident through his extensive citation record of over 114,000 times and his role as Editor-in-Chief for the Journal of Alzheimer's Disease. Beyond his research, he has been recognized for his scholarly contributions, mentorship, and commitment to diversity. He had also earned numerous awards. Dr. Perry has played a pivotal role in the growth of UTSA. Under his leadership USTA got designated as a Carneigie R-1 center, secured substantial funding, expanded research initiatives, and spearheaded many NIH-funded programs. His influence extends internationally, as seen through his memberships in Academies of Sciences in Mexico, Portugal, and Spain.

Finally, our last speaker Dr. Allan Basbaum will be presenting on "Long-term neuron, brain and spinal cord imaging of pain processing circuits in the awake, behaving animal." Dr. Basbaum started his research career in pain during his undergraduate degree and has continued working on it ever since. He trained under eminent scientists, Dr. Ronald Melzack and Dr. Patrick Wall, who revolutionized the field of pain by introducing the gate control theory of pain. Currently he is working as a professor and chair of Department of Anatomy at the University of California, San Francisco. Dr. Basbaum's research focus is diverse and includes study of central and peripheral mechanisms that process pain and itch messages; molecular mechanisms that contribute to chronic pain after tissue and nerve injury; and mechanism of action of general anesthetics using calcium imaging. Notably, he has served as the Editor-in-Chief of PAIN, the journal of the IASP, and as treasurer of the IASP. He holds memberships in esteemed organizations such as the American Academy of Arts and Sciences, the National Academy of Medicine, and the National Academy of Sciences, and is a fellow of the Royal Society in the United Kingdom. Dr. Basbaum currently serves as a council member of the National Institute of Neurological Diseases and Stroke and the HEAL (Health End Addiction Long-term) Multi-Disciplinary Working Group. With a prolific publication record, he has authored over 350 papers/chapters, boasting over 75,000 citations.

All the speakers are outstanding scientists representing this year's theme with their discoveries, research, and achievements. All the key note speaker presentations will be held in the Academic Event Center in Lubbock, AMSOP 107 in Amarillo, and ABSOP 2200 in Abilene. The SRW committee encourages everyone to attend the key note speaker seminars, followed by student-speaker meet and greets. Further, we have other events such as the IPE and vendor show. The vendor show will feature various vendors supplying biomedical science devices and technologies. This will be held on Wednesday, February 28th.

This year's IPE event, "FOMO sapiens: Cutting through the noise in an age of excess," explores the pervasive influence of Fear Of Missing Out (FOMO) in today's information-saturated society. Expert panel from diverse fields will help participants dissect the psychological, social, and cultural implications of behavioral engineering systems. Attendees will gain practical strategies for navigating the digital landscape mindfully, advocating for balanced technology use, and reclaiming control over their lives for a deeper sense of fulfillment beyond constant novelty.

The student poster sessions are set for February 28th and 29th, featuring over 260 students from TTUHSC and TTU campuses showcasing their research. March 1st will be bustling with keynote speakers, student talks, and the IPE event. We invite you all to join us for these sessions to learn from experts and peers and, in turn, make this event a success.

Finally, the event would not have been possible without the untiring and dedicated efforts of SRW 2024-TTUHSC team members. We would like to thank the faculty and staff of the GSBS, the Department of Neuroscience and Pharmacology, Offices of Student Services and Marketing and Communications, and the School of Medicine. We would also like to thank President Dr. Rice-Spearman, Chancellor Dr. Mitchell, Dr. McMahon, Dr. D'Agostino, Dr. Schneider, Dr. Neugebauer, Dr. Jones, Dr. Prien, Dr. Norbury, and Dr. Newcome. Lastly, we want to thank all the participants of the 36th annual Student Research Week, as their ideas, research, and collaborative efforts makes this such a successful event each year.

Sincerely,

The 36th Annual Student Research Week Committee,

Praneetha Panthagani, Neha Sawant, Megan Skains, Robert C Barnes, Manikantha Dunna, Ganesh Acharya, Philip S. Antwi- Adjei, Amanda Garcia, Naresh Sah, Tanima Sharker, Abdul Althaf Shaik, and Kerri (Spontarelli) Fruit

SCHEDULE OF EVENTS - WEDNESDAY & THURSDAY, FEB. 28 & 29

WEDNESDAY, FEBRUARY 28

8.00 am – 8.30 am: Breakfast
8.25 am – 8.30 am: Welcome by Drs. Schneider and McMahon
8.30 am – 9.30 am: Seminar by Keynote Speaker Dr. George Koob Ph.D.
Title: What is Addiction?: a Heuristic Neurobiological Perspective
(Virtual via Zoom, Broadcasted at the Academic Event Center Lubbock, AMSOP 107 - Amarillo and ABSOP2200 - Abilene)
9.30 am – 10.00 am: Student Advising Session with Dr. Koob (Virtual via Zoom)
10.00 am – 10.30 am: Break
10.30 am – 12.00 pm: Student Poster Session (Unjudged)
12.00 pm – 1.00 pm: Lunch
1.00 pm – 4.00 pm: Vendor Show
1.00 pm – 3.00 pm: Student Poster Session (Unjudged)
3.00 pm – 4.00 pm: Open Poster Session
8.30 am – 4.00 pm: Silent Auction

THURSDAY, FEBRUARY 29

8.30 am – 9.00 am: Breakfast
9.00 am – 12.00 pm: Student Poster Session (Judged and Unjudged)
12.00 pm – 1.00 pm: Lunch
1.00 pm – 3.00 pm: Student Poster Session (Judged and Unjudged)
3.00 pm – 4.00 pm: Open poster session
8.30 am – 4.00 pm: Silent Auction
6.30 pm – 9.00 pm: SRW 2024 Graduate Student Association Banquet
Location: Spirit Ranch, 701 Regis St, Lubbock, TX 79403

SCHEDULE OF EVENTS - FRIDAY, MARCH 1

FRIDAY, MARCH 1

8.00 am – 9.00 am: Breakfast
8.50 am – 8.55 am: Welcome by Dr. Schneider
8.55 am – 9.00 am: Welcome by Chancellor: Dr. Tedd Mitchell M.D.
9.00 am – 10.00 am: Seminar by Keynote Speaker Dr. George Perry Ph.D
Title: Mitochondria at the Center of Synaptic and Oxidative Abnormalities in Alzheimer's Disease
10.00 am – 10.15 am: Break
10.15 am – 11.15 am: Student Lightning Talks
11.15 am – 11.30 am: Break
11.30 am – 1.00 pm: Lunch and IPE: FOMO Sapiens: Cutting through the noise in the age of excess"
1.00 pm – 1.30 pm Break
1.30 pm – 2.30 pm: Seminar by Keynote Speaker Dr. Allan Basbaum Ph.D
Title: Long-term neuron brain and spinal cord imaging of pain processing circuits in the awake, behaving animal
2.30 pm – 2.40 pm Break
2.40 pm – 3.20 pm: Coffee with Speakers
3.20 pm – 3.30 pm: Break
3.30 pm – 4.00 pm: Post-Doctoral Fellowship Award and Seminar
4.00 pm – 4.05 pm: Recorded Message by President: Dr. Lori Rice-Spearman Ph.D
4.05 pm – 4.10 pm: Recorded Message by Provost: Dr. Darrin D'Agostino D.O., MPH, MBA
4.15 pm – 4.45 pm: SRW Poster Awards
4.45 pm – 4.55 pm: Recognizing American Heart Association Pre-Doctoral Fellowship Award Winners
4.55 pm – 5.00 am: Closing remarks
8.30 am – 12.00 pm: Silent Auction
6.00 pm: Neuroscience Appreciation Dinner
Location: Skyviews Restaurant, 1901 University Ave #600, Lubbock, TX 79410

All events for March 1st will be held in person for Lubbock campus and broadcasted to Amarillo (AMSOP 107) and Abilene (ABSOP2200) campuses.

GUEST SPEAKERS

Dr. George F. Koob is Director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA). He is also a Senior Investigator at the Intramural Research Program of the National Institute on Drug Abuse where he directs the Neurobiology of Addiction Laboratory in the Integrative Neurosciences Research Branch.

As an authority on alcohol use disorder, drug addiction and stress, he has contributed to our understanding of the neurocircuitry associated with the acute reinforcing effects of alcohol and drugs and the neuroadaptations of the reward and stress circuits associated with the transition to dependence. He has published over 800 peer reviewed papers, mentored 13 Ph. D students, 85 post-doctoral fellows, 11 K99's and authored several books including the "Neurobiology of Addiction". He received his Ph.D. in Behavioral Physiology from Johns Hopkins University in 1972. He did post-doctoral studies at Walter Reed Army Institute of Research and the University of Cambridge (England). He subsequently held positions at The Salk Institute and the Scripps Research Institute. Dr. Koob is the recipient of many honors, including membership in the National Academy of Medicine (USA) and award of the Legion of Honor (France).

Dr. George Perry is the Semmes Foundation Distinguished University Chair in Neurobiology, and is former Dean of Sciences at The University of Texas at San Antonio. Perry has studied Alzheimer's disease since 1982 and was the first to discover that oxidative stress is a key feature of this and related neurodegenerative diseases. His studies identified oxidative damage, its source from metabolic/mitochondria failure and catalysis by iron and copper. This work led to a novel interpretation of the role of amyloid—that instead of causing Alzheimer's disease, it is a protective antioxidant response, and the reason all the amyloid-based therapies have failed.

Perry is recognized internationally as one of the top Alzheimer's disease researchers and has been cited over 114,000 times. He founded and serves as Editor-in-Chief for the Journal of Alzheimer's Disease, the most prolific and cited journal in the field.

Dr. Allan Basbaum completed undergraduate studies at McGill University in Montreal, where he began his pain research studies with Ronald Melzack, did his PhD research at the University of Pennsylvania and postdoctoral research at University College London, with Patrick Wall. Presently, he is professor and chair of the Department of Anatomy at the University of California, San Francisco. His research focuses on peripheral and central nervous system mechanisms that process pain and itch messages, including the molecular mechanisms that contribute to chronic pain after tissue or nerve injury. Most recently, using calcium imaging, he began investigations into the mechanisms of action of different general anesthetics. He has served as Editor-in-Chief of PAIN, the journal of the IASP, treasurer of the IASP, is a member of the American Academy of Arts and Sciences, the National Academy of Medicine, the National Academy of Sciences and is a fellow of the Royal Society in the United Kingdom. He is presently a council member of the National Institute of Neurological Diseases and Stroke and the HEAL (Health End Addiction Long-term) Multi-Disciplinary Working Group. He has published over 350 papers/chapters, h-factor 127 and with over 75,000 citations.

STUDENT LIGHTNING TALKS

In addition to Poster Presentations, Student Research Week 2024 allowed participants to apply to present a Lightning Talk (a short 3-minute presentation followed by a 2-minute Questions & Answers period). Out of the 49 participants who showed initial interest, 8 were selected to present a Lightning Talk following evaluation by the Student Research Week 2024 Committee.

In order to fairly make this determination, all prospective abstracts and PowerPoint presentations were deidentified and evaluated by the Student Research Week 2024 Executive and Vice Directors. In the case of ties, the Student Research Week 2024 Subcommittee Members completed the same evaluations. Criteria for evaluation addressed formatting, content, and ability to be completed within the time limits. All criteria were provided to prospective Lightning Talk applicants prior to their submission of abstracts and presentations for evaluation.

Below, we highlight the names and titles of Lightning Talk Presentations at SRW 2024.

AKASH MAHESHWARI, School of Medicine, Year 2
Vision Correction and Eye Examinations in West Texas College Students

FLAVIA SARDELA DE MIRANDA, Graduate School of Biomedical Sciences, Year 3+
DVL3 knockdown modulates the expression of PD-L1 in a murine tumor model

JESSE YORK, School of Medicine, Year 3-4
Select psychiatric comorbidities are associated with reduced long-term survival following lobectomy for early-stage NSCLC – an analysis of 5,516 patients

KERRI (SPONTARELLI) FRUIT, Graduate School of Biomedical Sciences, Year 3+
Functional evaluation of a CMT2DD-causing ATP1A1 variant.

MARCOS ARCINIEGA, Graduate Medical Education Sciences
Fortifying Medical Education: The Impact of Supplemental, Instructional Lectures and The Use of Formative Exams

NARESH SAH, Graduate School of Biomedical Sciences, Year 3+
CF10: Pioneering the Fight Against Resistant Colorectal Cancer

VAISHNAVI VIVEK CHIDDARWAR, Rehab Sciences
The association between trait self-objectification, gender roles, and lower limb sensorimotor control during low- and high-impact tasks.

YASH MEHTA, Pharmaceutical Sciences
Beyond Antibodies: Advancing Glucose Transporter -1 (GLUT-1) Quantification with LC-MS/MS in Brain Endothelial Cells

Thank you to the

Reddy Family Foundation

for advancing the educational
and research missions at
Texas Tech University Health Sciences Center.

Through the foundation's generous donations, we have been able to support the following graduate students and postdoctoral scientists through annual scholarships and research awards.

	GSBS Graduate Student	TTUHSC Postdoctoral Scientist
2024	To Be Announced	To Be Announced
2023	Alejandra Gomez	Dr. Balakrishna Koneru
2022	Buse Baykoca-Arslan	--

In collaboration with the Reddy Family Foundation, we are honored to recognize these recipients!

Thank you to

Dr. Beverly Chilton

and

Dr. Tiva Kasemsri

for their generous scholarship donations that help support Student Research Week.

“My Mom told me I could be anything I wanted to be when I grew up. When I encountered prejudice against women in science, I just remembered her words. Her view of me encouraged me to realize my potential as a person and as a professional.”
Dr. Chilton on the Bette B. Chilton Scholarship

“We are pleased to support an outstanding Master of Science student who presents during Student Research Week with this scholarship.”
Dr. Kasemsri

JUDGES

Ravi Akkireddy

Abraham Al-Ahmad

Rachel Babcock

Jeremy Bailoo

Susan Bergeson

Michael Blanton

Boris Decourt

Quynh Hoa Do

John Griswold

Petar Grozdanov

Joao Pedro Torres Guimaraes

Josee Guindon

Abdul Hamood

Surajit Hansda

Valeria Jaramillo-Martinez

Michelle Keyel

Desalegn Kifle

J. Josh Lawrence

Barry J. Maurer

Mariacristina Mazzitelli

Michael Melkus

Volker Neugebauer

Christine Prater

Nermina Sarayli

Sambantham Shanmugam

Cameron Smith

Jennifer Souter

Dan Stuart

JUDGING CRITERIA

1. **Significance/Introduction.** Does the student address the significance of the work and why it is important to conduct this research? Is the background information clearly presented? Are the goals or aims clearly stated?

2. **Organization.** Were the methods mentioned/explained? Is the presentation well organized? Does the student show knowledge of the subject?

3. **Results.** Are tables or graphs used to enhance the presentation? Does the presenter explain the figures and results? Are the figures appropriately formatted and clearly understood?

4. **Discussion/Conclusions.** Does the presenter summarize the findings? Can the presenter discuss what the findings mean and their significance? Does the presenter identify future direction for project?

5. **Presentation/Response to Questions.** Was the presentation effective (eye contact, delivery, etc.)? Does the presenter use time effectively? Does the presenter answer questions in an organized, concise fashion?

POSTER AWARD CATEGORIES

- Bench/Basic Research 1 (3 awards)
- Bench/Basic Research 2 (3 awards)
- Clinical/Human 1 (3 awards for Medical, GMES, and Public Health students)
- Clinical/Human 2 (3 awards for Medical, GMES, and Public Health students)
- Undergraduate (2 awards)

PARTICIPANTS

At Student Research Week 2024, research that was categorized as Educational or Public Health, Original Graduate Research, Meta-Analysis, or Undergraduate was eligible to be Judged.
Participants in these categories who opted into judging are denoted by the symbol *.

CASE STUDIES

Yaw Adu
Gaurav Agrawal
Morgan Allen
Kayden Barber
Joseph Bayouth
Emily Baysden
Rorie Brister
Luke Brockbank
Maribel Castro
Bao Catteau
Katie Chen
Shelby Corbitt
Caroline Cushman
Mitch DeVolder
Seena Firouzbakht
John Fisher
Lauren Ford
Prudhvi Gundupalli
Cristian Hernandez
Marjorie Ho
Andrew Ibrahim
Tyler Ingersoll
Mallory Jenkins
Lewis Kelly
Sachi Khemka
Nathaniel Kimball
Matthew Li
Benjamin Lin
Kyle Mangum
Devi Nair
Amber Nanni
Zeid Nawas
Kevin Nguyen
Maryam Niazi
Foster Ogu
Robin Okpara
Dylan Parry
Radha Patel
Austin Patterson
Alejandro Ponce-Cruz
Nicole Remmert
Zach Salter
Delaney Sauers
Bennett Schackmuth
Mary Scheerer
Mariel Schroeder
Quratulain Shekoh
Subash Swarna
Geoff Thomas
Vivie Tran
Daniel Xue
Lucy Yu
Christopher Zias
Hafsa Zuberi

CHART REVIEWS

Erin Adams
Sara Al Dogom
Jack Allen
Ashlyn Anderson
Anthony Bruccoliere
Esther Burns
Luis Castro
Tristin Chaudhury
Cooper Deupree
Alistair Disraeli
Jaina Eckert
Riley Fortner
Avery Garcia
Adithi Govindan
Kurt Grabow
Taha Hassan
Suyash Jain
Ketan Jolly
Bradley Kent
Astha Khiani
Saahithi Kolli
Benjamin Lasota
Caitlyn Matejka
Grace McCrea
Virginia McGrath
Kaylen Meers
Maamoon Mian
Jyntre Millsap
Ben Mitchell
Megan Nguyen
Christina Nwankpa
Alvin Ouseph
Ky Paschall
Devki Patel
Ernesto Ponce-Cruz
Caroline Presson
Andres Rios
Jaylyn Robinson
Lizabelle Russell
Kaitlyn Santineau
Meron Tesfaye
Joel White
John Wolpert
Thomas Yeater
Jesse York
Ferris Zeitouni

EDUCATIONAL AND PUBLIC HEALTH RESEARCH

Michael Ammons
Marcos Arciniega*
Madison Bachler*
Madison Barr*
Or Belkin*
Pranathi Bingi*
Kelsey Brock
Elizabeth Bryant
Hannah Chaudhury
Mohammed Raiyan Choudhury*
Rachel DeGroot
Jackson Driskill

Caroline Finney*
Joselin Garcia
Camille Gavin
Nikhil Gogineni*
Colby Gordon*
Sarah Neal Horne
Najah Hussain*
Delaney Jenschke
Becky Joseph*
Irina Kim*
Nedha Kinnare
Westin Klein
Jennifer Krabacher*
Katherine Lakey*
Ziyang Li
Tanuj Mahendru
Akash Maheshwari*
Merry Mathew
Riley McCready*
Noriko Merida-Morales
Erin Millican
Claudia Morris*
Megan Murchison*
Willem Northcut*
Olugbenga Olokede
Ananya Potu*
Grace Purcell*
Jacob Roberts
Alheli Romero*
Sathyak Saini
Julie Sang*
Hannah Seo*
Colton Shepherd
Cameron Studzinski
Neeti Swami
Sophie Talbot
Patrick Thompson
Shraddha Trehan
Mosffa Ullah
David Vizcaino
Luke Whelchel
Jake Wilemon

GRADUATE ORIGINAL RESEARCH

Ganesh Acharya*
Lauren Adams*
Genesy Aickareth
Philip Antwi-Adjei
Javaria Baig*
Robert Barnes
Harrison Benson*
Anoushka Bhat*
Christian Bustamante
Elliotte Cannon*
Vaishnavi Vivek Chiddarwar*
Akash Dev
Manikantha Dunna*
Frank Frankovsky III*
Rebecca Gabrilska
Amanda Garcia*
Kimberly Garza*
Alejandra Gomez*
Julio Zuarth Gonzalez*
Ali Haggaz
Hoang Ho*
Md Sariful islam Howlader*
Zachary Jared Hurtado*
Iffat Jahan*
Caezaan Keshvani*
Hamed Khedmatgozar*
Lida Khodavirdilou*
Avantika Mallik*
Harry May*
Yash Mehta*
Flavia Sardela de Miranda*
Namratha Mohan
Rozenn Moundounga
Niiang Mung
Prathyusha Naidu*
Jesse Neely
Nhi Nguyen
Elliott Norman
Tasmin Rahman Omy*
Kseniia Orobets*
Jacqui Oropeza
Praneetha Panthagani*
Kinsey Rich

Alexis Rodriguez*
Valeria Mucharraz Rodriguez*
Emily Rook*
Naresh Sah*
Dzmitry Savitski*
Neha Sawant*
Rebecca Schneider
Daniel Self*
Abdul Shaik*
Tanima Sharker*
Sejal Sharma*
Megan Skains*
Gabriella Smalligan*
Shane Smith
Kerri Spontarelli Fruit*
Nathan Steele
Varshini Suresh*
Mosharaf Mahmud Syed*
Syed Mohammed Tareq*
Nghi Tran (Skyler)*
Emily Vanderpool
Britney Villegas
Antonio Vintimilla*
Colby Wood
Asha Worsham
Bailey Zeiler

LITERATURE REVIEWS

Shreya Balamurali
Austin Broadhead
Sean Daly
Robert "Blake" Fountain
Ricardo Isaiah Garcia
Nicholas Hancock
Blake Harp
Caleb Hawkes
Alex Heo
Nicholas A Householder
Jordan Kassab
Caryn Lawrence
Kit Rae Miller
Jennifer Noll
Shruti Patel
Farhood Salehi
Alexander Smith

LITERATURE REVIEWS

Caitlin Tayag
Brevin Thompson
Kritin K. Verma
Joshua Willms
Damla Yagmur

META-ANALYSIS

Jennifer Adjei-Mosi
Mark Gao*

POST-DOCTORAL

Khondker Ayesha Akter
Ashly Hindle
Murugananth Kumar Raju

UNDERGRADUATE

Lauren Conger*
Annmarie Farag*
Bovey Liu
Jocelyn Medina *
Dakota Robison*
Jordan Sanchez*
Minnie Tran
Noah Wong*
Isabella Zambrano
Charlie Zhang*

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

WEDNESDAY, FEB. 28, MORNING

ALEXANDER SMITH; Poster Board 1; Front, Right; 10:30 AM - 12:30 PM
ASHLY HINDLE; Poster Board 1; Back, Left; 10:30 AM - 12:30 PM
AUSTIN PATTERSON; Poster Board 1; Back, Right; 10:30 AM - 12:30 PM
BRITNEY VILLEGAS; Poster Board 2; Front, Left; 10:30 AM - 12:30 PM
CALEB HAWKES; Poster Board 2; Front, Right; 10:30 AM - 12:30 PM
CAROLINE CUSHMAN; Poster Board 2; Back, Left; 10:30 AM - 12:30 PM
CHRISTIAN BUSTAMANTE; Poster Board 2; Back, Right; 10:30 AM - 12:30 PM
DANIEL XUE; Poster Board 3; Front, Left; 10:30 AM - 12:30 PM
DEVKI PATEL; Poster Board 3; Front, Right; 10:30 AM - 12:30 PM
DYLAN PARRY; Poster Board 3; Back, Left; 10:30 AM - 12:30 PM
EMILY BAYSDEN; Poster Board 3; Back, Right; 10:30 AM - 12:30 PM
ESTHER BURNS; Poster Board 4; Front, Left; 10:30 AM - 12:30 PM
FARHOOD SALEHI; Poster Board 4; Front, Right; 10:30 AM - 12:30 PM
GAURAV AGRAWAL; Poster Board 4; Back, Left; 10:30 AM - 12:30 PM
JENNIFER NOLL; Poster Board 4; Back, Right; 10:30 AM - 12:30 PM
JOEL WHITE; Poster Board 5; Front, Left; 10:30 AM - 12:30 PM
JOHN FISHER; Poster Board 5; Front, Right; 10:30 AM - 12:30 PM
ALEJANDRO PONCE-CRUZ; Poster Board 5; Back, Left; 10:30 AM - 12:30 PM
KATIE CHEN; Poster Board 5; Back, Right; 10:30 AM - 12:30 PM
KAYDEN BARBER; Poster Board 6; Front, Left; 10:30 AM - 12:30 PM
KEVIN NGUYEN; Poster Board 6; Front, Right; 10:30 AM - 12:30 PM
LUIS CASTRO; Poster Board 6; Back, Left; 10:30 AM - 12:30 PM
MAAMOON MIAN; Poster Board 6; Back, Right; 10:30 AM - 12:30 PM
MALLORY JENKINS; Poster Board 7; Front, Left; 10:30 AM - 12:30 PM
MERON TESFAYE; Poster Board 7; Front, Right; 10:30 AM - 12:30 PM
MORGAN ALLEN; Poster Board 7; Back, Left; 10:30 AM - 12:30 PM
NICHOLAS A HOUSEHOLDER; Poster Board 7; Back, Right; 10:30 AM - 12:30 PM
PRUDHVI GUNDUPALLI; Poster Board 8; Front, Left; 10:30 AM - 12:30 PM
ROBERT "BLAKE" FOUNTAIN; Poster Board 8; Front, Right; 10:30 AM - 12:30 PM
ROBIN OKPARA; Poster Board 8; Back, Left; 10:30 AM - 12:30 PM
SHANE SMITH; Poster Board 8; Back, Right; 10:30 AM - 12:30 PM
SHELBY CORBITT; Poster Board 9; Front, Left; 10:30 AM - 12:30 PM
THOMAS YEATER; Poster Board 9; Front, Right; 10:30 AM - 12:30 PM
TYLER INGERSOLL; Poster Board 9; Back, Left; 10:30 AM - 12:30 PM
JOSELIN GARCIA; Poster Board 9; Back, Right; 10:30 AM - 12:30 PM

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

WEDNESDAY, FEB. 28, AFTERNOON

ADITHI GOVINDAN; Poster Board 1; Front, Left; 1:00 PM - 3:00 PM
ALEX HEO; Poster Board 1; Back, Left; 1:00 PM - 3:00 PM
ALI HAGGAZ; Poster Board 1; Back, Right; 1:00 PM - 3:00 PM
AMBER NANNI; Poster Board 2; Front, Left; 1:00 PM - 3:00 PM
JORDAN KASSAB; Poster Board 2; Front, Right; 1:00 PM - 3:00 PM
ANDRES RIOS; Poster Board 2; Back, Right; 1:00 PM - 3:00 PM
ANTHONY BRUCCOLIERE; Poster Board 3; Front, Left; 1:00 PM - 3:00 PM
ASHLYN ANDERSON; Poster Board 3; Front, Right; 1:00 PM - 3:00 PM
ASTHA KHIANI; Poster Board 3; Back, Left; 1:00 PM - 3:00 PM
AUSTIN BROADHEAD; Poster Board 3; Back, Right; 1:00 PM - 3:00 PM
BAILEY ZEILER; Poster Board 4; Front, Left; 1:00 PM - 3:00 PM
BAO CATTEAU; Poster Board 4; Front, Right; 1:00 PM - 3:00 PM
BEN MITCHELL; Poster Board 4; Back, Left; 1:00 PM - 3:00 PM
BENJAMIN LASOTA; Poster Board 4; Back, Right; 1:00 PM - 3:00 PM
BENJAMIN LIN; Poster Board 5; Front, Left; 1:00 PM - 3:00 PM
BLAKE HARP; Poster Board 5; Back, Right; 1:00 PM - 3:00 PM
BRADLEY KENT; Poster Board 6; Front, Left; 1:00 PM - 3:00 PM
BREVIN THOMPSON; Poster Board 6; Front, Right; 1:00 PM - 3:00 PM
CAITLIN TAYAG; Poster Board 6; Back, Left; 1:00 PM - 3:00 PM
CAMERON STUDZINSKI ; Poster Board 6; Back, Right; 1:00 PM - 3:00 PM
CAROLINE PRESSON; Poster Board 7; Front, Left; 1:00 PM - 3:00 PM
CHRISTINA NWANKPA; Poster Board 7; Front, Right; 1:00 PM - 3:00 PM
COLBY WOOD; Poster Board 7; Back, Left; 1:00 PM - 3:00 PM
COLTON SHEPHERD; Poster Board 7; Back, Right; 1:00 PM - 3:00 PM
COOPER DEUPREE; Poster Board 8; Front, Left; 1:00 PM - 3:00 PM
CRISTIAN HERNANDEZ; Poster Board 8; Back, Right; 1:00 PM - 3:00 PM
DAMLA YAGMUR; Poster Board 9; Front, Left; 1:00 PM - 3:00 PM
DELANEY JENSCHKE; Poster Board 9; Front, Right; 1:00 PM - 3:00 PM
DELANEY SAUERS; Poster Board 9; Back, Left; 1:00 PM - 3:00 PM
DEVI NAIR; Poster Board 9; Back, Right; 1:00 PM - 3:00 PM
ELLIOTT NORMAN; Poster Board 10; Front, Left; 1:00 PM - 3:00 PM
ERIN ADAMS ; Poster Board 10; Front, Right; 1:00 PM - 3:00 PM
ERIN MILLICAN; Poster Board 10; Back, Left; 1:00 PM - 3:00 PM
ERNESTO PONCE-CRUZ; Poster Board 10; Back, Right; 1:00 PM - 3:00 PM
FERRIS ZEITOUNI; Poster Board 11; Front, Left; 1:00 PM - 3:00 PM

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

WEDNESDAY, FEB. 28, AFTERNOON (CONTINUED)

FOSTER OGU ; Poster Board 11; Back, Right; 1:00 PM - 3:00 PM
GENESY AICKARETH; Poster Board 12; Front, Left; 1:00 PM - 3:00 PM
GEOFF THOMAS; Poster Board 12; Front, Right; 1:00 PM - 3:00 PM
HANNAH CHAUDHURY; Poster Board 12; Back, Left; 1:00 PM - 3:00 PM
ISABELLA ZAMBRANO; Poster Board 12; Back, Right; 1:00 PM - 3:00 PM
JACK ALLEN; Poster Board 13; Front, Left; 1:00 PM - 3:00 PM
JACQUI OROPEZA; Poster Board 13; Back, Right; 1:00 PM - 3:00 PM
JAINA ECKERT ; Poster Board 14; Front, Left; 1:00 PM - 3:00 PM
JAKE WILEMON; Poster Board 14; Front, Right; 1:00 PM - 3:00 PM
JAYLYN ROBINSON; Poster Board 14; Back, Left; 1:00 PM - 3:00 PM
JENNIFER ADJEI-MOSI; Poster Board 14; Back, Right; 1:00 PM - 3:00 PM
JESSE YORK; Poster Board 15; Front, Left; 1:00 PM - 3:00 PM
JOHN WOLPERT; Poster Board 15; Front, Right; 1:00 PM - 3:00 PM
JOSEPH BAYOUTH; Poster Board 15; Back, Right; 1:00 PM - 3:00 PM
KAITLYN SANTINEAU ; Poster Board 16; Front, Left; 1:00 PM - 3:00 PM
KELSEY BROCK; Poster Board 16; Back, Right; 1:00 PM - 3:00 PM
KIT RAE MILLER; Poster Board 17; Front, Left; 1:00 PM - 3:00 PM
KRITIN K. VERMA; Poster Board 17; Front, Right; 1:00 PM - 3:00 PM
KY PASCHALL; Poster Board 17; Back, Left; 1:00 PM - 3:00 PM
KYLE MANGUM; Poster Board 17; Back, Right; 1:00 PM - 3:00 PM
LAUREN FORD; Poster Board 18; Front, Left; 1:00 PM - 3:00 PM
LEWIS KELLY; Poster Board 18; Back, Right; 1:00 PM - 3:00 PM
LIZABELLE RUSSELL ; Poster Board 19; Front, Left; 1:00 PM - 3:00 PM
LUKE BROCKBANK; Poster Board 19; Front, Right; 1:00 PM - 3:00 PM
LUKE WHELCHEL; Poster Board 19; Back, Left; 1:00 PM - 3:00 PM
MARIBEL CASTRO; Poster Board 19; Back, Right; 1:00 PM - 3:00 PM
MARJORIE HO; Poster Board 20; Front, Left; 1:00 PM - 3:00 PM
MARY SCHEERER; Poster Board 20; Front, Right; 1:00 PM - 3:00 PM
MARYAM NIAZI; Poster Board 20; Back, Left; 1:00 PM - 3:00 PM
MATTHEW LI; Poster Board 20; Back, Right; 1:00 PM - 3:00 PM
MERRY MATHEW; Poster Board 21; Front, Left; 1:00 PM - 3:00 PM
MOSFFA ULLAH; Poster Board 21; Back, Right; 1:00 PM - 3:00 PM
MURUGANANTH KUMAR RAJU; Poster Board 22; Front, Left; 1:00 PM - 3:00 PM

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

WEDNESDAY, FEB. 28, AFTERNOON (CONTINUED)

NAMRATHA MOHAN; Poster Board 22; Front, Right; 1:00 PM - 3:00 PM
NATHANIEL KIMBALL; Poster Board 22; Back, Left; 1:00 PM - 3:00 PM
NEDHA KINNARE; Poster Board 22; Back, Right; 1:00 PM - 3:00 PM
NICOLE REMMERT ; Poster Board 23; Front, Left; 1:00 PM - 3:00 PM
NIIANG MUNG; Poster Board 23; Back, Right; 1:00 PM - 3:00 PM
NORIKO MERIDA-MORALES; Poster Board 24; Front, Left; 1:00 PM - 3:00 PM
QURATULAIN SHEKOH; Poster Board 24; Front, Right; 1:00 PM - 3:00 PM
RACHEL DEGROOT; Poster Board 24; Back, Left; 1:00 PM - 3:00 PM
RADHA PATEL; Poster Board 24; Back, Right; 1:00 PM - 3:00 PM
RICARDO ISAIAH GARCIA; Poster Board 25; Front, Left; 1:00 PM - 3:00 PM
RILEY FORTNER; Poster Board 25; Front, Right; 1:00 PM - 3:00 PM
RORIE BRISTER; Poster Board 25; Back, Left; 1:00 PM - 3:00 PM
SAAHITHI KOLLI ; Poster Board 25; Back, Right; 1:00 PM - 3:00 PM
SARA AL DOGOM; Poster Board 26; Front, Left; 1:00 PM - 3:00 PM
SEAN DALY; Poster Board 26; Back, Left; 1:00 PM - 3:00 PM
SHRADDHA TREHAN; Poster Board 26; Back, Right; 1:00 PM - 3:00 PM
SHREYA BALAMURALI; Poster Board 27; Front, Left; 1:00 PM - 3:00 PM
SHRUTI PATEL; Poster Board 27; Front, Right; 1:00 PM - 3:00 PM
SOPHIE TALBOT; Poster Board 27; Back, Left; 1:00 PM - 3:00 PM
SUYASH JAIN; Poster Board 27; Back, Right; 1:00 PM - 3:00 PM
TAHA HASSAN; Poster Board 28; Front, Left; 1:00 PM - 3:00 PM
VIRGINIA MCGRATH; Poster Board 28; Back, Right; 1:00 PM - 3:00 PM
VIVIE TRAN; Poster Board 29; Front, Left; 1:00 PM - 3:00 PM
ZACH SALTER; Poster Board 29; Front, Right; 1:00 PM - 3:00 PM
ZEID NAWAS; Poster Board 29; Back, Left; 1:00 PM - 3:00 PM
ZIYANG LI; Poster Board 29; Back, Right; 1:00 PM - 3:00 PM

THURSDAY, FEB. 29, MORNING

ALEXIS RODRIGUEZ; Poster Board 1; Front, Left; 9:00 AM - 11:00 AM
CAEZAAN KESHVANI; Poster Board 1; Front, Right; 9:00 AM - 11:00 AM
DANIEL SELF; Poster Board 2; Front, Left; 9:00 AM - 11:00 AM
ALVIN OUSEPH; Poster Board 2; Front, Right; 9:00 AM - 11:00 AM
BOVEY LIU; Poster Board 3; Front, Left; 9:00 AM - 11:00 AM
ANNMARIE FARAG; Poster Board 3; Front, Right; 9:00 AM - 11:00 AM
AKASH MAHESHWARI; Poster Board 4; Front, Left; 9:00 AM - 11:00 AM

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

THURSDAY, FEB. 29, MORNING (CONTINUED)

COLBY GORDON; Poster Board 4; Front, Right; 9:00 AM - 11:00 AM
GABRIELLA SMALLIGAN; Poster Board 5; Front, Left; 9:00 AM - 11:00 AM
CAITLYN MATEJKA ; Poster Board 5; Front, Right; 9:00 AM - 11:00 AM
GRACE MCCREA; Poster Board 6; Front, Left; 9:00 AM - 11:00 AM
NAJAH HUSSAIN; Poster Board 6; Front, Right; 9:00 AM - 11:00 AM
ALHELI ROMERO; Poster Board 7; Front, Left; 9:00 AM - 11:00 AM
OR BELKIN; Poster Board 7; Front, Right; 9:00 AM - 11:00 AM
PRANATHI BINGI; Poster Board 8; Front, Left; 9:00 AM - 11:00 AM
KINSEY RICH; Poster Board 8; Front, Right; 9:00 AM - 11:00 AM
LUCY YU; Poster Board 9; Front, Left; 9:00 AM - 11:00 AM
VALERIA MUCHARRAZ RODRIGUEZ; Poster Board 9; Front, Right; 9:00 AM - 11:00 AM
HAMED KHEDMATGOZAR; Poster Board 10; Front, Left; 10:00 AM - 12:00 PM
JAVARIA BAIG; Poster Board 10; Front, Right; 10:00 AM - 12:00 PM
OLUGBENGA OLOKEDE; Poster Board 10; Back, Left; 10:00 AM - 12:00 PM
HARRY MAY; Poster Board 11; Front, Left; 10:00 AM - 12:00 PM
BECKY JOSEPH; Poster Board 11; Back, Left; 10:00 AM - 12:00 PM
MANIKANTHA DUNNA; Poster Board 12; Front, Left; 10:00 AM - 12:00 PM
EMILY ROOK; Poster Board 12; Back, Left; 10:00 AM - 12:00 PM
MEGAN SKAINS; Poster Board 13; Front, Left; 10:00 AM - 12:00 PM
NEHA SAWANT; Poster Board 13; Front, Right; 10:00 AM - 12:00 PM
GRACE PURCELL; Poster Board 13; Back, Left; 10:00 AM - 12:00 PM
JENNIFER KRABACHER; Poster Board 13; Back, Right; 10:00 AM - 12:00 PM
MITCH DEVOLDER; Poster Board 14; Front, Right; 10:00 AM - 12:00 PM
KATHERINE LAKEY; Poster Board 14; Back, Left; 10:00 AM - 12:00 PM
MEGAN MURCHISON; Poster Board 14; Back, Right; 10:00 AM - 12:00 PM
SARAH NEAL HORNE; Poster Board 15; Front, Right; 10:00 AM - 12:00 PM
SYED MOHAMMED TAREQ; Poster Board 15; Back, Left; 10:00 AM - 12:00 PM
BENNETT SCHACKMUTH; Poster Board 16; Front, Left; 10:00 AM - 12:00 PM
NARESH SAH; Poster Board 16; Back, Left; 10:00 AM - 12:00 PM
CLAUDIA MORRIS; Poster Board 17; Front, Right; 10:00 AM - 12:00 PM
YASH MEHTA; Poster Board 17; Back, Left; 10:00 AM - 12:00 PM
MADISON BARR; Poster Board 18; Front, Right; 10:00 AM - 12:00 PM
RILEY MCCREADY; Poster Board 18; Back, Left; 10:00 AM - 12:00 PM

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

THURSDAY, FEB. 29, MORNING (CONTINUED)

MOHAMMED RAIYAN CHOUDHURY; Poster Board 19; Front, Right; 10:00 AM - 12:00 PM
MARK GAO; Poster Board 19; Back, Left; 10:00 AM - 12:00 PM
HANNAH SEO; Poster Board 19; Back, Right; 10:00 AM - 12:00 PM
ASHA WORSHAM; Poster Board 20; Front, Left; 10:00 AM - 12:00 PM
DAKOTA ROBISON; Poster Board 20; Back, Left; 10:00 AM - 12:00 PM
CHARLIE ZHANG; Poster Board 20; Back, Right; 10:00 AM - 12:00 PM
AMANDA GARCIA; Poster Board 21; Front, Left; 10:00 AM - 12:00 PM
HOANG HO; Poster Board 21; Back, Right; 10:00 AM - 12:00 PM
ANOUSHKA BHAT; Poster Board 22; Front, Left; 10:00 AM - 12:00 PM
PRANEETHA PANTHAGANI; Poster Board 22; Back, Right; 10:00 AM - 12:00 PM
FLAVIA SARDELA DE MIRANDA; Poster Board 23; Front, Left; 10:00 AM - 12:00 PM
MOSHARAF MAHMUD SYED; Poster Board 23; Back, Right; 10:00 AM - 12:00 PM
SUBASH SWARNA; Poster Board 24; Front, Left; 10:00 AM - 12:00 PM
ALEJANDRA GOMEZ; Poster Board 24; Back, Right; 10:00 AM - 12:00 PM
NOAH WONG; Poster Board 25; Front, Left; 10:00 AM - 12:00 PM
ANTONIO VINTIMILLA; Poster Board 25; Front, Right; 10:00 AM - 12:00 PM
VARSHINI SURESH; Poster Board 25; Back, Left; 10:00 AM - 12:00 PM
ANANYA POTU; Poster Board 25; Back, Right; 10:00 AM - 12:00 PM
VAISHNAVI VIVEK CHIDDARWAR; Poster Board 26; Front, Right; 10:00 AM - 12:00 PM
MADISON BACHLER; Poster Board 26; Back, Right; 10:00 AM - 12:00 PM
KERRI SPONTARELLI FRUIT; Poster Board 27; Front, Right; 10:00 AM - 12:00 PM
MARCOS ARCINIEGA; Poster Board 27; Back, Right; 10:00 AM - 12:00 PM
ABDUL SHAIK; Poster Board 28; Front, Right; 10:00 AM - 12:00 PM
DZMITRY SAVITSKI; Poster Board 28; Back, Right; 10:00 AM - 12:00 PM
WILLEM NORTHCUT; Poster Board 29; Front, Right; 10:00 AM - 12:00 PM
NIKHIL GOGINENI; Poster Board 29; Back, Right; 10:00 AM - 12:00 PM

THURSDAY, FEB. 29, AFTERNOON

KSENIIA OROBETS; Poster Board 1; Front, Left; 1:00 PM - 3:00 PM
GANESH ACHARYA; Poster Board 1; Front, Right; 1:00 PM - 3:00 PM
PRATHYUSHA NAIDU; Poster Board 2; Front, Left; 1:00 PM - 3:00 PM
TASMIN RAHMAN OMY; Poster Board 2; Front, Right; 1:00 PM - 3:00 PM
TANIMA SHARKER; Poster Board 3; Front, Left; 1:00 PM - 3:00 PM
ZACHARY JARED HURTADO; Poster Board 3; Front, Right; 1:00 PM - 3:00 PM

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

THURSDAY, FEB. 29, AFTERNOON (CONTINUED)

AKASH DEV; Poster Board 4; Front, Left; 1:00 PM - 3:00 PM
ALISTAIR DISRAELI; Poster Board 4; Front, Right; 1:00 PM - 3:00 PM
ANDREW IBRAHIM; Poster Board 5; Front, Left; 1:00 PM - 3:00 PM
AVERY GARCIA; Poster Board 5; Front, Right; 1:00 PM - 3:00 PM
CAMILLE GAVIN; Poster Board 6; Front, Left; 1:00 PM - 3:00 PM
CARYN LAWRENCE; Poster Board 6; Front, Right; 1:00 PM - 3:00 PM
CHRISTOPHER ZIAS; Poster Board 7; Front, Left; 1:00 PM - 3:00 PM
DAVID VIZCAINO; Poster Board 7; Front, Right; 1:00 PM - 3:00 PM
ELIZABETH BRYANT; Poster Board 8; Front, Left; 1:00 PM - 3:00 PM
EMILY VANDERPOOL; Poster Board 8; Front, Right; 1:00 PM - 3:00 PM
HAFSA ZUBERI; Poster Board 9; Front, Left; 1:00 PM - 3:00 PM
JACKSON DRISKILL; Poster Board 9; Front, Right; 1:00 PM - 3:00 PM
SEJAL SHARMA; Poster Board 10; Front, Left; 1:00 PM - 3:00 PM
JULIO ZUARTH GONZALEZ; Poster Board 10; Front, Right; 1:00 PM - 3:00 PM
KETAN JOLLY; Poster Board 10; Back, Left; 1:00 PM - 3:00 PM
KIMBERLY GARZA; Poster Board 11; Front, Right; 1:00 PM - 3:00 PM
KAYLEN MEERS; Poster Board 11; Back, Left; 1:00 PM - 3:00 PM
IFFAT JAHAN; Poster Board 12; Front, Right; 1:00 PM - 3:00 PM
JYNTRE MILLSAP; Poster Board 12; Back, Left; 1:00 PM - 3:00 PM
LIDA KHODAVIRDILOU; Poster Board 13; Front, Right; 1:00 PM - 3:00 PM
JOSHUA WILLMS; Poster Board 13; Back, Left; 1:00 PM - 3:00 PM
NGHI TRAN (SKYLER); Poster Board 14; Front, Right; 1:00 PM - 3:00 PM
JACOB ROBERTS; Poster Board 14; Back, Left; 1:00 PM - 3:00 PM
JESSE NEELY; Poster Board 14; Back, Right; 1:00 PM - 3:00 PM
KHONDKER AYESHA AKTER; Poster Board 15; Front, Left; 1:00 PM - 3:00 PM
KURT GRABOW; Poster Board 15; Front, Right; 1:00 PM - 3:00 PM
IRINA KIM CAVDAR; Poster Board 15; Back, Left; 1:00 PM - 3:00 PM
MARIEL SCHROEDER; Poster Board 16; Front, Right; 1:00 PM - 3:00 PM
FRANK FRANKOVSKY III; Poster Board 16; Back, Left; 1:00 PM - 3:00 PM
MEGAN NGUYEN; Poster Board 17; Front, Right; 1:00 PM - 3:00 PM
ELLIOTTE CANNON; Poster Board 17; Back, Left; 1:00 PM - 3:00 PM
MICHAEL AMMONS; Poster Board 18; Front, Right; 1:00 PM - 3:00 PM
CAROLINE FINNEY; Poster Board 18; Back, Left; 1:00 PM - 3:00 PM
MINNIE TRAN; Poster Board 19; Front, Right; 1:00 PM - 3:00 PM

JUDGING GROUPS

Please note that the Poster Presentations below are organized by time and location of presentation, not alphabetically.

THURSDAY, FEB. 29, AFTERNOON (CONTINUED)

AVANTIKA MALLIK; Poster Board 19; Back, Left; 1:00 PM - 3:00 PM
JULIE SANG; Poster Board 19; Back, Right; 1:00 PM - 3:00 PM
NATHAN STEELE; Poster Board 20; Front, Left; 1:00 PM - 3:00 PM
NEETI SWAMI; Poster Board 20; Front, Right; 1:00 PM - 3:00 PM
NHI NGUYEN; Poster Board 20; Back, Left; 1:00 PM - 3:00 PM
PATRICK THOMPSON; Poster Board 21; Front, Right; 1:00 PM - 3:00 PM
PHILIP ANTWI-ADJEI; Poster Board 21; Back, Right; 1:00 PM - 3:00 PM
REBECCA GABRILSKA; Poster Board 22; Front, Right; 1:00 PM - 3:00 PM
REBECCA SCHNEIDER; Poster Board 22; Back, Right; 1:00 PM - 3:00 PM
ROBERT BARNES; Poster Board 23; Front, Right; 1:00 PM - 3:00 PM
ROZENN MOUNDOUNGA; Poster Board 23; Back, Right; 1:00 PM - 3:00 PM
SACHI KHEMKA; Poster Board 24; Front, Right; 1:00 PM - 3:00 PM
NICHOLAS HANCOCK; Poster Board 24; Back, Right; 1:00 PM - 3:00 PM
YAW ADU; Poster Board 25; Front, Left; 1:00 PM - 3:00 PM
LAUREN CONGER; Poster Board 25; Back, Left; 1:00 PM - 3:00 PM
HARRISON BENSON; Poster Board 25; Back, Right; 1:00 PM - 3:00 PM
WESTIN KLEIN; Poster Board 26; Front, Left; 1:00 PM - 3:00 PM
MD SARIFUL ISLAM HOWLADER; Poster Board 26; Back, Right; 1:00 PM - 3:00 PM
TRISTIN CHAUDHURY; Poster Board 27; Front, Left; 1:00 PM - 3:00 PM
JOCELYN MEDINA ; Poster Board 27; Back, Right; 1:00 PM - 3:00 PM
TANUJ MAHENDRU; Poster Board 28; Front, Left; 1:00 PM - 3:00 PM
JORDAN SANCHEZ; Poster Board 28; Back, Right; 1:00 PM - 3:00 PM
SATHYAK SAINI; Poster Board 29; Front, Left; 1:00 PM - 3:00 PM
SEENA FIROUZBAKHT; Poster Board 29; Front, Right; 1:00 PM - 3:00 PM
LAUREN ADAMS; Poster Board 29; Back, Right; 1:00 PM - 3:00 PM

Graduate School of Biomedical Sciences, years 1-2

GANESH ACHARYA; CHINNADURAI MANI, NARESH SAH, KARUNAKAR SAAMARTHY, MARK REEDY, KOMARAIAH PALLE

Novel therapeutic strategy targeting PARG and DNA damage checkpoint (Chk1) synergistically kills ovarian cancer cells and overcome resistance

Chemoresistance contributes to majority of deaths in women with ovarian cancer (OC). Altered DNA repair and metabolic signalling implicated in mediating therapeutic resistance. DNA damage checkpoint kinase 1 (CHK1) integrates cell cycle and DNA repair in replicating cells, and its inhibition causes replication stress, repair deficiency and cell cycle dysregulation. We observed elevated Poly-ADP ribosylation (PAR) of proteins (PARylation) and subsequent decrease in cellular NAD+ levels in OC cells treated with CHK1 inhibitor prexasertib, indicating activation of NAD+ dependent DNA repair enzymes poly-ADP ribose polymerases (PARP1/2). While multiple PARP inhibitors were in clinical use in treating OC, tumor resistance to these drugs is highly imminent. We reasoned that inhibition of dePARylation by targeting Poly(ADP-ribose) glycohydrolase (PARG) would disrupt metabolic and DNA repair crosstalk to overcome chemoresistance. Although PARG inhibition (PARGi) trapped PARylation of the proteins and activated CHK1, it did not cause any significant OC cell death. However, OC cells deficient in CHK1 were hypersensitive to PARGi, suggesting a role for metabolic and DNA repair cross talk in protection of OC cells. Correspondingly, OC cells treated with combination of CHK1 and PARG inhibitors exhibited excessive replication stress mediated DNA lesions, cell cycle dysregulation and mitotic catastrophe compared to individual drugs. Interestingly, increased PARylation observed in combination treatment resulted in depletion of NAD+ levels. These decreased NAD+ levels were also paralleled with reduced aldehyde dehydrogenase (ALDH) activity, which requires NAD+ to maintain cancer stem cells. Furthermore, prexasertib and PARGi combinations exhibited synergistic cell death in OC cells, including isogenic chemoresistant cell line and 3D organoid models of primary patient derived OC cell lines. Collectively, our data highlight a novel crosstalk between metabolism and DNA repair involving replication stress and NAD+ dependent PARylation, and suggest a novel combination therapy of CHK1 and PARG inhibitors to overcome chemoresistance in OC.

PHILIP ANTWI-ADJEI; BRENT KISBY; SHANMUGAM SAMBANTHAM PHD; IGOR PONOMAREV PHD.

EFFECTS OF TLR3 ACTIVATION ON TEMPORAL IMMUNE PROFILES OF BRAIN AND BLOOD IN MALE AND FEMALE FVB/B6 MICE.

Introduction: Alcohol use disorder (AUD) is associated with increased inflammation. Alcohol activates toll-like receptors leading to the release of inflammatory molecules, which may contribute to changes in AUD-related behaviors like increased alcohol consumption. Activation of toll-like receptor 3 (TLR3) by Polyinosinic:polycytidylic acid (Poly(I:C), PIC) cytokines release associated with changes in alcohol consumption, which is sex- and genotype-specific. For example, male mice of some genotypes drink more ethanol after repeated injections of PIC, while females do not. There is little known about the role of peripheral vs central inflammation in regulation of alcohol consumption. In this study, we investigated the relationship between blood and brain levels of proinflammatory cytokines, chemokines and other immune molecules in male and female mice after TLR3 activation by PIC. Sex differences in the levels of the immune mediators in blood and brain over time may in part explain differences in alcohol consumption. We hypothesized that the immune profiles in brain and blood after TLR3 activation will be different between males and females.
Methods: Male and female mice on mixed genetic background were ip injected with PIC. Blood and perfused prefrontal cortex brain tissues were collected at 0, 6, 24 and 48 hours. mRNA and protein levels of several immune genes were measured using qPCR and ELISA.
Results: Preliminary experiments in males showed that majority of immune genes induced by PIC, such as, IL-6, IL-1B, TNF-alpha, TLR3 and TLR4, had higher expression in blood than brain, while Chemokine (C-C motif) ligand 5 (CCL5) had higher expression in brain, compared to blood.
Conclusion: There were distinct profiles of TLR3 activation – induced immune genes in blood and brain and suggested disparate/ sex-specific roles of these molecules in regulation of alcohol consumption.

JAVARIA BAIG; NEHA SAWANT; PRIYANKA RAWAT; ARUBALA P REDDY PHD; P HEMACHANDRA REDDY PHD; SUDHIR KSHIRSAGAR PHD

Abnormal interaction of Rlip with mutant APP/Abeta and phosphorylated tau reduces wild-type Rlip levels and disrupt Rlip function in Alzheimer's disease

Background: Alzheimer's disease (AD) is a neurodegenerative disease that affects a large proportion of the aging population. RalBP1 (Rlip) is a stress-activated protein, that plays an important role in aging and neurodegenerative diseases such as Alzheimer's disease.
Hypothesis: Mutant APP and mutant Tau interact with the Rlip protein which leads to decreased wild-type Rlip levels and disrupt Rlip function in Alzheimer's disease. Rlip can be a promising new target for aging, Alzheimer's disease, and other neurological diseases.
Methods: We conducted coimmunoprecipitation and colocalization analyses of wild-type APP (WtAPP), mutant APP (mAPP), wild-type Tau (WtTau) and mutant Tau (mTau) in HT22 cells which express Rlip to understand molecular interactions between Rlip and mAPP and mTau..
Results: Both mAPP and mTau interact with Rlip protein, which was further confirmed by the colocalization data. While WtAPP interacts very little with Rlip protein and WtTau does not interact with the Rlip protein. As seen in our co-immunoprecipitation finding, we found that Rlip colocalizes with mAPP/Aβ and mTau/p-Tau.
Conclusions: These findings suggest that Rlip interacts with mAPP and mTau, leading to reduced Rlip in cells. Current study findings together with observations of prior in vitro studies revealed that physical interaction between Rlip and mAPP/Aβ and Rlip and mTau induces oxidative stress, mitochondrial dysfunction and synaptic/mitophagy impairments. Based on these findings, we cautiously conclude that overexpression of Rlip and/or reduction of mAPP/Aβ and mTau/p-Tau levels are promising therapeutic strategies.

ROBERT BARNES, SATISH BANJARA, DR. JOSÉE GUINDON, DVM PHD

Evaluation of ACEA's Impact on Inflammatory Pain Anti-nociception, Motor Coordination, Anxiety, and Temperature and a Mechanistic Exploration involving CB1, CB2, and 5-HT1A Receptors

Introduction:
Rheumatic disease is characterized by inflammatory pain and is amongst the most common causes of chronic pain, which represents a significant detriment to quality of life. In recent years, interest in cannabinoids as an alternative or adjuvant antinociceptive agent has increased. Cannabinoids primarily act through cannabinoid receptor 1 (CB1), which is mostly found in the central nervous system, and cannabinoid receptor 2 (CB2), which is mostly found in the immune and enteric nervous system. Activation of the CB1 receptor has been associated with antinociceptive effects in previous research. However, research into CB1 sex differences and mechanisms of CB1 induced side effects is relatively lacking.
Methods:
The antinociceptive effects of arachidonoyl 2'-chloroethlyamide (ACEA), a selective CB1 agonist, was evaluated with wild-type C57Bl6J mice using the formalin model of inflammatory pain. The effects of CB1 activation, via ACEA, on motor coordination, anxiety, and temperature were further evaluated using the rotarod test, the open field test, and rectal temperature monitoring. Further the mechanism of ACEA's effects on pain, coordination, anxiety, and temperature was evaluated by prior blockade of CB1 receptors (via AM251), CB2 receptors (via AM630), or serotonin-1A receptors (via WAY-100635).
Results:
ACEA provided antinociceptive benefit in both male and female wild-type mice in the formalin model of inflammatory pain. No significant sex differences were noted in its antinociceptive effects. Evaluation of ACEA's effects on motor coordination, anxiety, and temperature are ongoing.
Conclusions:
As interest in cannabinoid usage continues to grow, it is important to gain a better understanding of both their mechanisms of effects and any possible sex differences.

MANIKANTHA DUNNA; DR. BALAKRISHNA KONERU, PHD; DR. PATRICK REYNOLDS, MD PHD

Exploring Synergistic Cytotoxicity of APR-246 and BSO in Neuroblastoma: A Comprehensive Analysis of Glutathione Depletion and ROS Elevation

Introduction: Clinical outcome for children with neuroblastoma, the most common extra-cranial pediatric solid tumor, has improved in recent years, but treating patients with progressive disease remains a major challenge. Previously, our lab reported that due to the high ATM kinase activation found in alternative lengthening of telomeres (ALT) neuroblastomas, reactivation of p53 with the clinical-stage drug APR-246 (eprenetapopt), was effective at enhancing tumor response to irinotecan. APR-246 binds to thiols and depletion of Glutathione (GSH) has been shown to enhance APR-246 activity by diminishing its binding to GSH. GSH, the most common thiol antioxidant in cells, can be depleted by inhibiting the rate-limiting synthetic enzyme (γ-glutamylcysteine synthetase) with buthionine sulfoximine (BSO). Here, we hypothesize that, in combination with BSO, APR-246 may show potential cytotoxicity by inhibiting GSH, thus enhancing access of APR-246 to p53 and also elevating the levels of reactive oxygen species (ROS). Methods and Results: This study investigates the combined efficacy of APR-246 and BSO in inducing cytotoxicity in neuroblastoma cell lines. The combination exhibits significant in vitro cytotoxicity in both ALT (CHLA-90, COG-N-512, COG-N-700, SK-N-FI) and MYCN-amplified (COG-N-519, SK-N-BE2) neuroblastoma cell lines cultured at 5%O2, as evaluated by the DIMSCAN cytotoxicity assay. As a single agent, APR-246 showed approximately 1 log cell kill; however, when combined with BSO, showed 4 logs of cell kill. Combination indices for all cell lines are less than 1, indicating synergy (based on Chou-Talay method). At a clinically achievable dosage (APR-246: 5μM and BSO: 50μM), mean combination indices for ALT cell lines are 0.01, and for MYCN-amplified cell lines, it is 0.66. Statistical analyses for survival fraction were performed using two-way ANOVA (P value: <0.0001). Conclusion: Thus, combining BSO with APR-246 is a promising drug combination that warrants evaluation in vivo in neuroblastoma xenograft models.

KIMBERLY GARZA, UYEN TRAN, GAIL A. CORNWALL

Amyloid containing granules in rat sperm are potential epigenetic carriers

Introduction: Environmental exposures throughout a father's life can cause epigenetic changes in the germline which can be propagated to his children, changing their phenotype and potentially causing disease across multiple generations. Although changes in classical epigenetic marks such as DNA methylation have been observed, the epigenetic carrier remains unknown. In yeast it's established that environmental stress can trigger cytosolic transcription/translation factors to change from a native conformation into a heritable beta-sheet rich amyloid, altering protein function and phenotype across generations. Cytosolic inheritance has also been documented in C. elegans, where phase-transitioned/amyloid germ granules (GG) carry genome-preserving ribonucleoproteins and small RNAs functioning as paternal epigenetic carriers in sperm. However, although GG are vital for spermatogenesis, they are thought to be absent from mature sperm in higher order organisms. Methods/Results: To test the hypothesis that cytosolic amyloid inheritance occurs in mammals, we used a model of epigenetic inheritance in which Sprague Dawley rats were exposed to the fungicide vinclozolin. We first examined the androgen receptor (AR) by immunofluorescence, a direct target of the antiandrogen vinclozolin and known amyloidogenic protein. We found AR in three cytosolic sperm sites: the perforatorium, centrosome, and perifossal zone. In the perforatorium AR appeared in punctate amyloid positive structures. Further studies revealed the presence of GG markers in the puncta, known to form assemblies controlling translation and RNA metabolism, and GMCL1, a protein also found in humans that closely resembles a key C. elegans GG component that is required for paternal epigenetic inheritance. Preliminary studies showed the presence of RNA in these structures, characteristic of GG. Conclusion: Our studies reveal that GG are present in mature sperm and provide a viable mode by which cytosolic amyloid inheritance is possible in mammals. Further research is necessary to understand how AR amyloid fits into this epigenetic pathway.

ZACHARY J. HURTADO, PEYTON PRESTO, TAKAKI KIRITOSHI, MARIACRISTINA MAZZITELLI, GUANGCHEN JI, AND VOLKER NEUGEBAUER

BDNF in the amygdala modulates sensory and affective neuropathic pain behaviors

Introduction: Chronic pain is a profound and arduous health care issue to remediate. While many therapies are ineffective with adverse side effects, this requires a better mechanistic understanding to investigate new therapeutic strategies. It is well established now that the amygdala, a limbic brain region, plays a critical role in the modulation of pain, fear, and anxiety behaviors. Mechanisms of pain-related amygdala neuroplasticity are not fully understood. Previous data suggest that Brain Derived Neurotrophic Factor (BDNF) plays a critical role in neuroplasticity and may be dysregulated in chronic pain models and neuropsychiatric diseases such as anxio-depressive disorders. BDNF given exogenously can ameliorate conditions like anxiety, pointing toward the amygdala as a potential target. However, the role of BDNF signaling in the amygdala in pain modulation is not yet known. Typical BDNF signaling involves the tyrosine kinase TrkB receptor.
Methods: This study examined the effects of BDNF and a TrkB receptor antagonist (ANA-12) in the central amygdala on the modulation of pain- and anxiety-related behaviors, using a chronic neuropathic pain model in rats (spinal nerve ligation, SNL). Adult male rats were implanted with a guide cannula targeting the central amygdala, and after 2 days of recovery, BDNF or ANA-12 were administered by micro-dialysis for 20 minutes. Sensory and emotional-affective behaviors were measured.
Conclusion / Results: BDNF, but not ANA-12, had antinociceptive effects in the von Frey test. BDNF, but not ANA-12, had anxiolytic effects on the Elevated Plus Maze. The data suggest that exogenous delivery of BDNF into the amygdala can modulate neuropathic pain behavior while the lack of clear antagonist effects may suggest that this system is not sufficiently activated in the pain condition.

IFFAT JAHAN; MARK REEDY; KOMARAIAH PALLE

CF10 is a potent novel chemotherapeutic drug for TNBC

Breast cancer is the second leading cause of death in the US and among the subtypes of triple-negative breast cancer (TNBC) is the most aggressive, highly metastatic, and highest mortality rate cancer. TNBC cells lack the expression of any hormone receptors (ER, PR, and Her-2/Neu) leaving chemotherapy as the primary therapy. Also, heterogeneity, chemoresistance, and recurrence are the main blockades to the successful treatment of TNBC. All these situations emphasize the urgent need for developing novel therapy. CF10 is the 2nd generation of widely used therapeutic fluoropyrimidine F10. The anticancer activity of CF10 has been analyzed in multiple pre-clinical model models of pancreatic ductal adenocarcinoma (PDAC). CF10 exerts its unique cytotoxic mechanism against highly proliferating malignant cells by targeting dually the two key enzymes thymidine synthase (TS) and DNA topoisomerase 1 (Top1). Specially, by inhibiting Thymidylate synthase (TS); the rate-limiting enzyme of DNA base thymine synthesis, leading to a “Thymineless state”, nucleotide imbalance, and DNA damage. So we hypothesized that CF10 would be a potent chemotherapeutic drug for triple-negative cancer. We are evaluating the anticancer effect of CF10 in TNBC by analyzing the key enzymes involved in DNA damage and repair pathways through western blot. According to the literature, BRCA gene mutation (BRCA1 and BRCA2) is more than 50% responsible for developing TNBC, especially BRCA1. Our lab data suggested that CF10 is capable of exerting its DNA-damaging effect both in BRCA+ and BRCA- cell lines. CF10 anticancer activity also demonstrates a significant effect on cell survival and colony formation assays. Collectively, our pre-clinical study illustrates a novel chemotherapeutic drug to combat highly metastatic and recurrent triple-negative breast cancer.

CAEZAAN KESHVANI; MICHELLE KEYEL, PHD; C. PATRICK REYNOLDS, MD PHD

GD3 ganglioside not a potential cell surface immunotherapeutic target for neuroblastoma therapy

Background: GD2 is a validated immunotherapeutic target for neuroblastoma, the most common extracranial solid tumor of childhood and anti-GD2 antibodies are used to treat neuroblastoma patients. GD3 is a precursor ganglioside for GD2, a cell surface antigen commonly overexpressed on neuroblastoma cells. GD3 is synthesized in the endoplasmic reticulum by GD3 synthase (ST8SIA1). GD3 is highly overexpressed on cell surface of some cancers (melanomas and T-cell lymphomas). GD3 has been shown to be expressed in neuroblastomas. Anti-GD2/GD3 vaccines are currently being evaluated in clinical trials for high-risk neuroblastoma therapy. As therapy with anti-GD2 antibodies can select for low GD2 expression, it has been postulated that a vaccine stimulating immune cells to target GD3 in addition to GD2 could be effective in preventing recurrence of neuroblastoma in patients.
Hypothesis: GD3 is not expressed on the cell surface of neuroblastomas with low or high GD2 expression.
Methods: We performed assessed expression using flow cytometry and an antibody to GD3 of GD3 on the cell surface of 20 patient-derived neuroblastoma patient derived cell lines (PDCLs) with both low and high GD2 expression. qPCR was also performed on cell lines to assess expression of GD3 synthase (ST8SIA1).
Results: We found that 0 of 20 neuroblastoma cell lines assessed expressed GD3 on the cell surface, but expression was present internally within some of the cell lines. GD2 expression on the cell surface did not show any significant correlation with lack of GD3 expression in PDCLs. ST8SIA1 mRNA expression did not correlate with GD3 expression.
Conclusion: GD3 expression on neuroblastoma cell surface based on the cohort of PDCLs evaluated indicates that GD3 is not a valid vaccine therapeutic target for neuroblastoma.

HAMED KHEDMATGOZAR, MSC; SAYANIKA DUTTA, MSC; MICHAEL DOMINGUEZ, BS; DANIEL LATOUR, BS; MELANIE JOHNSON, BS; MOHAMED FOKAR, PHD; IRFAN WARRAICH, MD; WERNER DE RIESE, MD; ROBERT J. MATUSIK, PHD; LUIS BRANDI, MD; SRINIVAS NANDANA, PHD; MANISHA TRIPATHI, PHD*

TIAM1 signaling drives prostatic budding and branching phenotypes and is a potential therapeutic target for BPH

Introduction: Benign prostatic hyperplasia (BPH) is the most prevalent urologic disease in men aged over 50 years. However, the molecular mechanisms that drive BPH pathophysiology remain elusive. Method: In this study, we integrated bioinformatic and experimental analyses of human BPH to identify TIAM1-RAC1 signaling pathway as a promising candidate for a molecular-based approach for BPH therapy. Results: First, elevated TIAM1 expression in a BPH transcriptomic signature that was generated from the analysis of RNA-seq data from three independent BPH patient cohorts was validated at the protein level in a fourth patient cohort. Additional bioinformatic analyses of the BPH transcriptomic signature pointed to TIAM1-RAC1 pathway as the potential lead therapeutic pathway; and NSC23766 - a small molecule inhibitor of TIAM1 signaling - as a developmental lead compound for BPH therapy. Next, a proof-of-concept pharmacological approach of TIAM1-RAC1 inhibition in human prostatic cells using NSC23766 resulted in attenuated organoid budding and branching - a developmental program associated with prostatic nodule formation and BPH pathogenesis. Finally, shRNA-based genetic knock-down of TIAM1 in human prostatic cells led to a reduction in budding and branching phenotypes thereby phenocopying the effects of NSC23766. Conclusion: Together, our observations implicate elevated TIAM1 as a driver of budding and branching in BPH, and our studies pave the way for TIAM1-RAC1 based targeted approach for the treatment of the disease.

KHORDAVIRDILOU, LIDA; ZUARTH GONZALEZ, JULIO; DR. MUKHOPADHYAY, SUSHOBHAN, PHD; GUADAGNOLI, NICHOLAS; DR. MCCURDY, CHRISTOPHER, PHD; DR. MCMAHON, LANCE, PHD; AND DR. WILKERSON, JENNY, PHD

Investing the effects of Mitragynine on Food-motivated behavior.

Introduction: Kratom, scientifically known as Mitragyna speciosa, has been a subject of interest for its potential in self-treating substance use disorders (SUD), including methamphetamine addiction. The study aimed to investigate the hypothesis that mitragynine does not diminish the reinforcing effects of a natural reinforcer, such as food, in comparison to its observed impact on self-administration of methamphetamine. Methods: Male and female Sprague Dawley rats underwent training to self-administer 20 mg food pellets, during 2-hour sessions, establishing lever-pressing behavior under a fixed ratio (FR) 1 schedule of reinforcement. The reinforcement schedule gradually increased to FR5, with a maximum of 100 reinforcers allowed. After achieving stable responding over three consecutive sessions, the study evaluated the effects of pretreatment with either vehicle or mitragynine (at doses of 10, 17.8, 32, and 56 mg/kg, i.p.), with the order of doses counterbalanced. Results: Food self-administration led to significant lever presses on the active lever compared to the inactive lever and resulted in maximum reinforcers earned. Notably, none of the administered doses led to a decrease in food self-administration. Conclusions: These results indicate that mitragynine does not influence natural reward-driven behavior and exhibits greater selectivity for methamphetamine-related behavior.

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CARYN LAWRENCE; DR. J. JOSH LAWRENCE, PHD

Vitamin A Deficiency in Children with Autism Spectrum Disorder

Introduction: A majority of the human population has micronutrient deficiencies which leads to several improperly regulated pathways in the body. The effects of vitamin A (VA) deficiency have been investigated in the context of autism spectrum disorder (ASD). The main research question is what neural signaling pathways are disrupted by a deficiency in VA, assessing whether supplementation will reverse the symptoms caused by the original deficiency. Methods: This study is a literature review to summarize recent findings on the correlation between VA deficiency and ASD. Embase and PubMed were the databases utilized to research articles. Results: All-trans retinoic acid (ATRA) is a VA metabolite that is utilized in the nervous system. ATRA regulates synaptic strength and is utilized in signaling involved in neurogenesis and neural differentiation. ATRA also indirectly regulates the release of oxytocin which plays a role in social behavior. ATRA also plays a role in the digestive tract. Deficiency in VA may lead to the inability to properly respond to nutrients and antimicrobial agents in the intestine, compromising immune regulation. Consistent with these mechanisms common symptoms seen in ASD are cognitive delays, deficits in social behavior, and digestive issues. These symptoms are aided by VA sufficiency. Conclusion: Several lines of research have shown promise in VA supplementation helping to reduce GI and cognitive symptoms in ASD, suggesting an important role of the gut-brain axis. Supplementation also aids in rescuing the loss of social behavior. This review highlights important knowledge gaps in the areas of ASD and VA, which may lead to advancing the field through increased awareness and treatment strategies.

HARRY MAY, NIGHAT NOUREEN, IN-HYOUNG YANG, KRISTYN MCCOY, JONAS NANCE, DIANA IXLAMATI-NAVA, MEREDITH S. IRWIN, MICHAEL D. HOGARTY, C. PATRICK REYNOLDS, MIN H. KANG

Chemotherapy response of neuroblastoma patient-derived xenografts suggests METTL1/EZH2/Myc axis as a potential target to overcome resistance to cyclophosphamide and topotecan

Introduction
Neuroblastoma (NBL) is the most common extra-cranial solid tumor that develops in the sympathetic nervous system of children. The 5 years survival rate for high-risk NB patients is less than 60%, and approximately 15% of high-risk neuroblastoma patients develop progressive disease (PD) during induction chemotherapy that includes cyclophosphamide (cyclo) and topotecan (topo). As tumor biopsies are often not obtained at the time of progressive disease, identifying underlying genetic/genomic features that contribute to disease progression is challenging.
Methods
Thirty-five patient-derived xenografts (PDX) established from NBL cells in bone marrow aspirates or blood samples of high-risk patients were classified by induction chemotherapy: Non-responders (NR) and responders (R). The gene expression profiles were analyzed by three different methods including differential analysis (DEGs) via edgeR, binomial regression model, and student's t-test to identify the marker genes for the NR group. The markers were validated using real-time RT-PCR and Western blot analysis in PDX samples. Additionally, gene modification was performed to enhance the understanding of the mechanism of drug resistance.
Results
PDX cyclo/topo response was non-response (NR, n=7) and response (R, n=28). The RNA-seq data analysis identified 145 differentially expressed genes across the NR versus response groups. After further filtration by a regression model and t-test significance, METTL1 was subject to gene modification to evaluate the associations between METTL1/EZH2/Myc expression. Cell lines (COG-N-421h and COG-N-519) have shown high METTL1 expression from NR. METTL1 knockdown decreases the expression level of EZH2/Myc as well as cancer stem cell markers.
Conclusions
The gene expression profile of the well-characterized and clinically relevant panel of PDXs can potentially provide a biomarker to identify patients destined to have suboptimal responses to induction chemotherapy. Genes overexpressed in non-responding PDXs provide potential molecular targets to reverse drug resistance and its mechanism in high-risk neuroblastoma patients.

ALEXIS RODRIGUEZ, RACHEL WASHBURN, GURVINDER KAUR, JANNETTE M. DUFOUR

Sertoli Cell Regulation of the Complement System

While transplantation is effective at treating many diseases, challenges accompany this procedure, including the availability of transplantable tissue and immune rejection. Xenotransplantation may be the solution to provide an essentially unlimited supply of organs. However, xenografts must overcome a robust immune rejection response by the recipient's immune system. A major factor leading to graft rejection is antibody-mediated activation of the complement system, which functions to protect the body from foreign pathogens. Therefore, for xenotransplanted tissue to overcome rejection, it must evade antibody-mediated complement cell lysis. Interestingly, Sertoli cells (SC) create and maintain an immune-protective environment within the testis. Previously, our lab found mouse and pig SC survive after exposure to xenogeneic complement at significantly higher levels than other cells. Therefore, the goal of this study is to determine the mechanisms by which SC evade and regulate complement-mediated destruction and create an immune-protective environment. Using an in vitro model, we confirmed the survival of neonatal pig SC (NPSC) and killing of pig aortic endothelial cells (PAEC), confirmed the expression of complement-related genes by NPSC, and found that components secreted by NPSC confer protection to PAEC after a 1.5-hour exposure to normal human serum (NHS, contains antibodies and complement). By using PAEC as a killing control, this study confirmed the survival of NPSC after a 15-hour exposure to NHS. Additionally, expression of complement-related genes by NPSC was elevated after a 15-hour exposure to NHS, and PAEC had increased survival after a 1.5-hour incubation with NHS when cultured in SC conditioned media (SCCM) compared to PAEC cultured without SCCM. As xenotransplanted tissues must overcome complement-mediated lysis, the mechanisms through which SC regulate xenogeneic complement activated could be translated clinically to improve the survival of xenotransplanted tissues, making this procedure and effective treatment option for patients on the organ waiting list.

NEHA SAWANT, RAINIER ALVIR, SUDHIR KSHIRSAGAR, LLOYD BUNQUIN, HALLIE MORTON, ARUBALA P. REDDY AND P. HEMACHANDRA REDDY

Protective effects of SSRI, Citalopram in the dorsal raphe nucleus of Alzheimer's disease mouse models

Background: Depression is one of the most common neuropsychiatric comorbidities in Alzheimer's disease (AD). Apart from its anti-depressive and anxiolytic effects, selective serotonin reuptake inhibitor (SSRI) treatment also offers intracellular modifications that may help improve neurogenesis, amyloid burden, Tau pathology, and neuroinflammation. Despite its multifaceted impact in the brain, the exact physiological and molecular mechanism by which SSRIs improve neurogenesis and synaptogenesis in AD is poorly understood. Further, the dorsal raphe region (DRN) which the largest serotonergic nucleus in brain is believed to be involved in the disease progression of AD and is not studied yet.
Hypothesis: As serotonin is one of the most dysregulated neurotransmitters in AD, in the present study we explored AD related cellular changes in the DRN. Further we studied protective effects of SSRI Citalopram in the DRN as a potential therapeutic alternative for treating AD related pathologies.
Methods: We investigated TPH2, SERT, 5HTR1a, pTau, APP, Synaptophysin and PSD95, mRNA and protein levels by RT-qPCR, immunoblotting and immunofluorescence staining in Citalopram treated and untreated APP and Tau mouse models. Additionally, we also conducted behavioral studies on mice and dendritic spine density analysis on postmortem mouse brains. Statistical significance was determined, using one-way ANOVA.
Results: Citalopram treatment reduced pTau, TPH2, SERT, and 5HTR1a levels, while up-regulating synaptophysin and PSD95 levels especially in the Tau mouse models. These findings were endorsed by the increased dendritic spine density and improved cognitive behavior of the treated mice compared to that of the untreated ones.
Conclusions: Taken together these findings suggest that pTau could be playing a critical role in the serotonergic pathway and therefore, Citalopram could not only be a promising therapeutic drug for treating depression in AD, but also for delaying the progression of AD.

DANIEL SELF; DR. PABLO ARTIGAS, PHD

FXYDs in zebrafish osmoregulation

Zebrafish (Danio rerio) are freshwater fish and a common laboratory model organism that can survive in extremely pure water. Zebrafish have been shown to concentrate sodium ions from water containing as little as 0.01 mM sodium. This sodium uptake corresponds with upregulation of a Na+,K+-ATPase (NKA) isoform, ATP1A1.5, which is purportedly involved in sodium import and likely has a stoichiometry of one sodium ion exported and one potassium ion imported per ATP utilized. When expressed in Xenopus oocytes, the ATP1A1.5 pump produces an outward current of ions under low sodium external conditions, which is the opposite of its purported function. There is no detectable potassium induced current, which would be consistent with its supposed electroneutral 1:1:1 stoichiometry. When the isozyme is coexpressed with the zebrafish FXYD protein, FXYD11, the outward current when there is cytoplasmic sodium and no extracellular sodium is absent. FXYDs have long been known to be an auxiliary subunit of the NKA, however this would be the first example of a FXYD protein that is required for the proper physiological functioning of an NKA isozyme. The nature of the outward current, the effect of FXYD11, and the biochemistry of this NKA isoform are being evaluated.

TANIMA SHARKER, DEVARAJA RAJASEKARAN, SOUAD SENNOUNE AND YANGZOM D. BHUTIA

Dual targeting of SLC6A14 and SLC7A5 for a better therapeutic outcome in pancreatic ductal adenocarcinoma

Pancreatic ductal adenocarcinoma (PDAC) is highly lethal with a five-year survival rate only in single digits. There is a dire need to identify better therapeutics or drug targets to combat this deadly disease. Nutrient transporters, in particular amino acid transporters (AATs) are known to be significantly upregulated in PDAC. In fact, our laboratory has identified SLC6A14 and SLC38A5 as tumor promoters and thereby viable drug targets for PDAC therapy. Apart from SLC6A14 and SLC38A5, other ATTs like SLC1A5, SLC7A5, and SLC7A11 are well established tumor promoters. In this project the goal is to test the expression profile of the 5 AATs (SLC1A5, SLC6A14, SLC7A5, SLC7A11, and SLC38A5) and to further test whether targeting the top 2 significantly upregulated AATs simultaneously leads to a better therapeutic outcome than targeting it singly. Based on our preliminary data using 5 human PDAC organoids (hM19B, hT1, hT105, hF23, and hM1A), we found SLC6A14 and SLC7A5 to be consistently upregulated across all the samples tested. While SLC6A14 and its role in PDAC has already been established by our lab, we also corroborated SLC7A5 expression and patient survival using GEPIA (Gene Expression Profile Interactive Analysis) in tumor (n=179) and normal (n=171) samples. Our future goals include validating our preliminary data in 21 PDAC patient-derived xenograft (PDXs) samples using Real-time PCR and further test our hypothesis (both by genetic deletion & pharmacological blockade) that targeting SLC6A14 and SLC7A5 simultaneously will lead to a better therapeutic outcome than targeting either one of them singly. PDAC organoids will be used as models.

MEGAN MARIE SKAINS, D. MARIEN CORTES, AND LUIS G. CUELLO

A novel KcsA mechanosensitive gating mechanism and crystallization conditions determine its Rb+ binding affinity constant and crystallographic ion occupancy.

The crystal structures of potassium channels (K-channels) contain a four ion binding sites selectivity filter (SF), with ions bound to binding sites S1, S2, S3 and S4. However, when crystallized in a Rb+-containing solution, ions are bound at sites S1, S3 and S4, with a vacancy at the S2. Our laboratory identified a KcsA-mutant (T75V) that binds Rb+ at sites S1, S2 and S3. This unexpected result led us to identify a novel mechanosensitive gating in KcsA. Hence, we propose that the well-known Rb+ bound KcsA structure obtained by Roderick Mackinnon Laboratory is an inactive conformation. We submit that the crystallization conditions biased KcsA's activation gate (AG) to the open state and due to a well-known allosteric mechanism, its SF ion occupancy was reduced. This observation has profound implications in our mechanistic interpretation of ion permeation in K-channels. We hypothesize that the use of Decyl-Maltoside (a detergent of small micelle size) and acidic conditions (pH 5.4) during the KcsA crystal trials opened its AG, triggered its inactivation, and vacated the S2 site. This idea is supported by the lower Rb+ binding affinity determined by Isothermal Titration Calorimetry (ITC) using the original crystallization conditions. Additionally, we crystalized KcsA in conditions that favored a closed AG to determine the unperturbed Rb+ occupancy at its SF. We observed changes in the electron density map, enough to model a Rb+ at the S2 site. Additionally, we hypothesized that non-inactivating KcsA mutant E71A should contain 4 Rb+ bound to its selectivity filter and a Rb+ binding-affinity independent of the crystallization condition. We performed ITC experiments using the E71A mutant, and as predicted, this mutant displayed a very high affinity for K+ and Rb+ that were mostly independent of the crystallization conditions. Our findings have profound implications in our current understanding of ion permeation in K-channels.

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THE DRUG-STIMULATED ATPASE ACTIVITY OF P-GLYCOPROTEIN: THE INFLUENCE OF LIPID ENVIRONMENT

P-glycoprotein (Pgp), a multidrug transporter, relies on ATP binding and hydrolysis to expel hydrophobic compounds, including anticancer drugs, from cells, significantly impacting drug bioavailability and pharmacokinetics. Lipids and cholesterol have been shown to modulate Pgp's ATPase activity when isolated in detergent solutions and substrate transport activity when reconstituted into proteoliposomes. Native lipid extracts from sources like E. coli, liver, or brain tissues, while supportive of Pgp functionality, are unsuitable for biophysical assays due to their undefined composition and high UV absorbance. Conversely, studies using synthetic lipids, often bilayer-forming phosphatidylcholine, have exhibited low ATPase activity and reduced drug binding. This study explores the impact of different lipid head groups on verapamil-stimulated ATPase activity in purified Pgp within detergent-lipid micelles. Verapamil-stimulated ATPase activity was evaluated in the presence of E. coli lipids compared to a synthetic lipid mixture, primarily composed of palmitoyloyl-phosphatidylcholine (POPC) and -phosphatidylethanolamine (POPE). Results showed that supplementing POPC/POPE with lipids like sphingomyelin (SM), cardiolipin, or phosphatidic acid enhanced verapamil-stimulated activity and reduced the concentration required for half-maximal activity (EC50). Cholesterol and its derivative Cholesterol hemisuccinate (CHS) significantly decreased EC50, likely by supporting the drug binding sites' functional integrity. High CHS concentrations (>15%) increased basal activity, potentially due to CHS binding to the drug binding site, acting cooperatively with verapamil.
When Pgp was reconstituted into liposomes or nanodiscs, it exhibited higher basal activity and sustained verapamil-stimulated activity, resembling the natural plasma membrane environment. This provides a stable source of synthetic lipid mixtures with SM and cholesterol or CHS, restoring Pgp functionality akin to the natural setting. This research paves the way for future functional and biophysical studies, enhancing our understanding of the role of the lipid environment in Pgp's drug transport.

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Graduate School of Biomedical Sciences, years 3+

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Evaluating the efficacy of a synthetic antimicrobial peptide against fungal biofilms

Introduction: Worldwide incidence of multidrug resistance (MDR) has risen to an alarming rate. The CDC has listed Candida auris–a MDR fungal pathogen–as the highest MDR threat level, requiring greater attention and action. Pathogenic fungi can cause serious infection by forming biofilms and disseminating systemically, increasing mortality in immunocompromised patients. Although Candida albicans is the most implicated fungal species associated with infection, the rising C. auris has increasing incidence in hospital-associated infections. Fungi are particularly problematic as they have a limited repertoire of antifungal agents, many of which are highly toxic to host cells. Overall, these threats equate to infections that are significantly difficult to treat. Therefore, alternative antifungals are desperately needed to expand the clinical toolkit. Synthetic antimicrobial peptides (sAMP) have shown promise in the antibacterial field, but less have been evaluated against fungi. This study utilized a sAMP with reported efficacy against bacteria to determine its antifungal potential. We hypothesized that our sAMP will display antifungal activity against Candida biofilms while exhibiting limited toxicity to host cells.
Methods: To determine sAMP efficacy as an antifungal agent, we established C. albicans and C. auris biofilms in vitro prior to sAMP administration. Fungal inhibition was measured by metabolic activity and eradication was assessed via viability and compared to currently available antifungals. Additionally, to test for host toxicity, we evaluated host cell viability and inflammation in vitro and in vivo compared to vehicle control.
Results: We observed improved inhibition and eradication of both C. albicans and C. auris when compared to known antifungal fluconazole. In addition, we exposed our sAMP to host cells and in vivo which resulted in limited inflammation and toxicity.
Conclusion: Together, these results demonstrated that our sAMP may be a promising antifungal agent. Future investigations will evaluate efficacy of this sAMP against in vivo infections.

AMANDA GARCIA; AVA OLIVER; AUDREE MACIAS; DR. SHARILYN ALMODOVAR, PH.D.

The Role of Human Immunodeficiency Virus, Antiretroviral Drug Therapy, and CXCR4 Signaling in Pulmonary Vascular Gene Expression

Introduction. Pulmonary vasoconstriction is a major cause for concern in people living with Human Immunodeficiency Virus (HIV) since the risk of developing pulmonary diseases increases upon infection with HIV. There is a gap in knowledge on the exact contribution of HIV to severe pulmonary vascular remodeling. This study sought to understand the vascular mechanisms associated with response to the virus. Methods. This study focused on three cell types: pulmonary artery endothelial cells (EC) as vascular mediators, smooth muscle cells (SMC) as effectors of vasoconstriction, and T cells as cellular sources of HIV. Pulmonary arterial EC and SMC purchased from Lonza were grown in co-culture for 24 hours before exposure to HIV NL43 (a CXCR4-utilizing strain) infected T cells at MOI:1. Cell cultures were maintained in a 37°C humidified incubator at 5% CO2. We compared the expression of markers for angiogenesis, vasoconstriction, vasodilation, inflammatory responses, apoptosis, cell adhesion molecules, coagulation, and platelet activation in triculture samples that were either untreated, treated with HIV only, treated with combination antiretroviral drug therapy (0.05 mM Tenofovir, 0.01 mM Emtricitabine, 0.003 mM Darunavir, 0.005 mM Ritonavir) obtained from HIV Reagents Program, or treated with 0.651 mM AMD3100 (SelleckChem), a CXCR4 antagonist. Additionally, we analyzed the impact of HIV on endothelial cell biology using PCR arrays (Qiagen). Results. Preliminary studies have shown that the expression of smooth muscle cell vasoconstrictive markers ACTA2 (actin alpha 2), MYH11(myosin heavy chain 11), and TAGLN (transgelin) statistically significantly increased after exposure to CXCR4-tropic HIV-1. When treated with AMD3100, the expression of vasoconstrictive markers statistically significantly lower than that of samples that were HIV-infected only. Conclusion. This work highlights, for the first time, specific changes in gene expression in vascular EC and SMC in response to HIV.

ALEJANDRA GOMEZ, JEREMY D. BAILOO, PHD, GAIL A. CORNWALL, PHD

CRES in the Brain Extracellular Matrix – A Key Player in Neuroplasticity and PNN Remodeling.

CRES is the defining member of a subgroup of family 2 cystatins of cysteine protease inhibitors. Our lab previously demonstrated that a functional extracellular amyloid matrix composed of several CRES subgroup members is present along the mouse epididymal lumen. Recently, we showed that CRES mRNA and protein are expressed by astrocytes and specific populations of neurons in the hippocampus and cortex. Further, CRES knock-out (KO) male mice exhibited behavioral inflexibility in a two-choice water T-maze test compared to wild-type (WT) males, whereas female KO mice outperformed their WT counterparts. Growing evidence shows that remodeling of the brain extracellular matrix (ECM) underlies neuroplasticity and, if unregulated, can lead to pathology. We hypothesize that CRES amyloid is part of the brain ECM and, because of amyloid's inherent shape-shifting properties, plays a role in ECM structure and plasticity. Examination of different populations of ECM from the male and female hippocampus showed CRES protein was present in all populations but enriched in the tightly bound ECM known as perineuronal nets (PNNs). PNNs play critical roles in neuroplasticity and consolidation of memory. Additionally, isolated ECM from HT22 cells (a hippocampal neuronal cell line) showed CRES colocalizes with thioflavin S, an indicator of amyloid. These data suggest CRES amyloid is in the ECM. Staining with wisteria floribunda (WFA) a marker for PNNs, showed a sex-specific decrease in fluorescence intensity in CRES KO mice, indicative of altered PNN structure. Our data suggest CRES amyloid contributes to the brain ECM structure and is involved in sex-specific remodeling and neuroplasticity that underlies the differences in behavior in CRES KO mice.

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DVL3 knockdown modulates the expression of PD-L1 in a murine tumor model

Introduction: Triple-negative breast cancer (TNBC) patients remain at high risk for disease recurrence and early metastasis. An option to improve patient outcome is the use of immune system modulators, such as immune checkpoint inhibitors (ICIs). Although TNBC has a higher mutational burden and antigen-specific T cell infiltration among all breast cancer (BC) subtypes, those are still low when compared to other tumors, limiting ICIs efficacy. Therefore, newer therapeutic approaches are needed. Our preliminary RNA-seq in human BC cells with altered Dishevelled (DVL) 3 expression identified novel immunomodulatory genes regulated by this protein, however, how that influences immune activation in the tumors is still unknown. Using mouse and human BC cell lines, we investigated the effects of DVL3 knockdown over immunoregulation.
Methods: shRNA lentiviruses were used to generate non-targeted control (NTC) and DVL3 knockdowns for human (MDA-MB-468) and mouse (4T1, AT3, and EO771) BC cell lines. The generated cell lines were used in vitro to assess the expression of immune-related genes. For in vivo, one million 4T1 NTC or shDVL3 cells were implanted into the mammary fat pad of BALB/c mice. Mice were sacrificed on day 21 and tumors were collected and analyzed for mRNA and protein expression.
Results: DVL3 knockdown in vitro resulted in overall increased PD-L1 gene expression in the mouse mammary carcinoma cell lines compared to NTC. Interestingly, in vivo, DVL3 knockdown resulted in decreased PD-L1 expression in the tumors, at both the mRNA and protein levels, compared to the control. No differences in tumor volume or weight between the different groups were observed.
Conclusions: DVL3 is involved with immune regulation in the tumors, with its knockdown leading to upregulation of PD-L1 in vivo. Further experiments are needed to unravel the effects of DVL3 modulation on immune cell recruitment and the consequences of associating DVL3 modulation with ICIs.

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Ellagic Acid (EA) promotes Osteoblastic Differentiation of Dental Pulp-Derived Stem Cells (DPSCs) by regulating Kruppel-like factor 2 (KLF2) and BMP2 signaling

Objective: To determine the efficacy of a flavonoid compound ellagic acid (EA) in promoting osteoblastic differentiation of dental pulp-derived stem cells (DPSC), by elucidating the in-depth underlying regulatory mechanisms to develop a regenerative therapy.
Background: Osteoporosis is a metabolic bone disorder that causes bone deterioration and hampers bone growth. Although many treatments are available, they only slow down bone density loss and don't facilitate bone regeneration. Developing an effective regenerative therapy requires understanding the underlying mechanisms. So, it is important to understand the underlying mechanisms and develop a novel effective regenerative therapy. Polyphenolic compounds are appealing to researchers due to their established considerable anti-inflammatory and antioxidant properties. Numerous fruits, such as pomegranates, pecans, and raspberries, contain a significant amount of EA, which is a flavonoid polyphenol. However, the in-depth underlying regulatory mechanisms are yet to be established.
Our laboratory is focused on investigating antioxidant regulatory mechanisms and found that a transcription factor, krüppel-like factor (KLF2) is modulated during osteogenic differentiation of DPSC. We have shown previously that the KLF2 is upregulated during osteoblast differentiation and by increasing the expression of Runx2, it promotes osteoblast differentiation and mineralization of DPSC. Additionally, we have found that bone morphogenetic proteins (BMP) and their associated downstream effectors are involved in almost every aspect of osteoblastic differentiation and maturation. It is also established that several cellular functions and molecular signaling pathways regulate the osteoblasts and osteoclasts for maintaining bone homeostasis during bone remodeling. Recently, autophagy has emerged as one of the mechanisms in bone remodeling and regeneration.
Methods: Herein, we evaluated various structural and functional molecules of osteogenesis pathways along with autophagy and mitophagy molecules by adding EA (5 mM) to the DPSCs for 7 and 14 days. Then, we observed calcium deposition and assessed the expression of osteoblastic-specific markers, autophagy, mitophagy, and KLF2 molecules using qRT-PCR, western blot, and immunocytochemistry methods.
Results: We found that the EA induced the osteoblastic-specific markers along with BMP2 pathway molecules and induced the expression of KLF2 at the mRNA and protein levels in the presence of EA. In addition, we observed significant upregulation of autophagic markers and Mitophagy markers in the presence of EA.
Conclusion: These data indicate that EA facilitates osteogenic differentiation of DPSC by inducing KLF2 and upregulating BMP2 signaling pathway molecules. Studies have reported an established relationship between KLF2 and autophagy; in this study, we found that EA induced the autophagy and mitophagy markers, and induced the expression of KLF2, so, there might be a link between those molecules that needs further investigation.

NHI T. NGUYEN, SATHISH SIVAPRAKASAM, AND VADIVEL GANAPATHY

Biological functions of the amino acid transporter SLC38A5 in colitis and colon cancer

Ulcerative colitis is a serious disease with chronic clinical symptoms that increase the risk of developing colon cancer. Colon cancer is the third leading cause of cancer death. Previous studies have shown that SLC38A5 is upregulated in colon cancer and is the major glutamine transporter in the lumen-facing apical membrane of the crypt cells in the intestine. SLC38A5 is an amino acid-dependent Na+/H+ exchanger transporting specific amino acids: glutamine, asparagine, histidine, serine, glycine, and methionine. Glutamine is involved in protein synthesis, energy production, and purine/pyrimidine synthesis, thus being essential for cell survival and cell proliferation. Serine and glycine are important for one-carbon metabolism. Consequently, SLC38A5 provides amino acids to support cell renewal and cell proliferation. In ulcerative colitis, renewal of the villus cells damaged due to inflammation is contingent upon the ability of the stem cells in the crypt to rapidly proliferate and differentiate which is critical for the maintenance of the barrier function in the colon. Similarly, rapid cell proliferation is the hallmark of cancer. We hypothesize that SLC38A5 might protect against ulcerative colitis and at the same time promote colon cancer. We studied the role of Slc38a5 in colitis by comparing the disease progression in wildtype and Slc38a5-knockout mice in an experimental model of ulcerative colitis: dextran sulfate sodium-induced colitis. Following two one-week cycles of exposure to 2.5% dextran sulfate sodium, the knockout mice exhibited markedly increased colitis progression and suffered >50% mortality. The barrier function, as evaluated with FITC-dextran permeability of the gut, was significantly compromised in the knockout mice under inflammation conditions. Our study also identified c-Myc and p53 as the transcriptional factors that upregulate SLC38A5 expression by using isogenic colon cancer cell lines HCT116 and SW48. These data demonstrate that SLC38A5's function is accelerating intestinal tissue repair and provides valuable insight into the molecular mechanisms for the upregulation of the transporter in colon cancer.

TASMIN R. OMY ; MARK REEDY ; KOMARAIAH PALLE

Targeting Rad6/Rad18 mediated DNA damage tolerance and repair signaling to overcome chemoresistance in ovarian cancer

Tumor resistance to therapy remains a significant hurdle in treating cancer, especially in advanced stages where recurrence often leads to a more aggressive disease phenotype. Understanding the molecular mechanisms underlying recurrent tumors is crucial for developing effective treatment strategies. Chemoresistance in cancer involves multiple cellular processes, including enhanced DNA damage repair, altered cell cycle checkpoints, and decreased drug uptake, which can be influenced by genetic and epigenetic factors. In ovarian cancer (OC), dysregulated microRNAs (miRNAs), DNA damage repair mechanisms, and the acquisition of stem cell-like features are associated with disease recurrence and chemoresistance. Genomic analyses of OC tumors reveal dysregulation of cancer stem cell signaling and DNA repair genes in recurrent tumors, with a significant proportion predicted to have DNA repair defects. Notably, overexpression of DNA repair proteins Rad6 and Rad18 is frequently observed in recurrent OC, leading to enhanced repair and stem cell marker expression. Targeting Rad6/Rad18 ubiquitin signaling presents a promising therapeutic approach to prevent and treat platinum drug-resistant OC. Experimental findings demonstrate that miR221_5p post-transcriptionally regulates RAD18, restoring sensitivity to platinum drugs. Moreover, chemotherapy-induced upregulation of RAD6 alters the epigenetic landscape by ubiquitinating histone variants, thereby modulating genes involved in DNA repair, cell survival, and chemoresistance. Inhibiting Rad6 with a small molecule inhibitor, combined with platinum-based drugs, shows synergistic anticancer effects. This approach holds potential for overcoming chemoresistance and improving treatment outcomes in OC patients. By targeting Rad6/Rad18 signaling pathways, novel therapeutic strategies can be developed to effectively combat OC and enhance patient survival. Overall, these findings pave the way for innovative treatments that could significantly impact the management of OC and offer new hope for patients facing this challenging disease.

KSENIIA S. OROBETS; ELENA B. TIKHONOVA; ANDREY L. KARAMYSHEV

Revealing Early Steps of Amyloid Precursor Protein Synthesis to Understand Molecular Basis of Alzheimer's Disease

Alzheimer's disease (AD) is the most common neurodegenerative disorder. One of the molecular hallmarks of the disease is the accumulation of the amyloid β (Aβ) plaques. Amyloid β is the product of the amyloidogenic processing pathway of the amyloid precursor protein (APP). Amyloidogenic processing has been intensively studied, however early steps of APP protein synthesis remain unknown. APP is a membrane protein containing the N-terminal signal peptide. Membrane and secretory proteins follow a specific targeting pathway to reach the endoplasmic reticulum (ER). Signal recognition particle (SRP) dependent and SRP-independent pathways are known. SRP is the most common pathway, and it was assumed it is used for APP. No experimental data demonstrating this assumption were obtained so far. Early steps of APP biogenesis remain uncharacterized, and there is no evidence if APP is targeted to the ER by SRP or by other unestablished factors. Our results demonstrate for the first time that APP is not a regular SRP substrate. While depletion of SRP54, an SRP subunit, leads to mRNA degradation of the typical SRP substrates activating RAPP protein quality control, APP mRNA level evaluated by RT-qPCR remains practically unaltered. APP protein level in cells and in culture medium coincides RT-qPCR data and does not show notable decrease in APP abundance. These data suggest that other unknown factors are involved in APP targeting. To detect and to identify these factors we developed a unique in vitro site-specific photo-crosslinking system. We also tested if APP translocation to the ER lumen is conducted through the ER membrane complex SEC61. The depletion of SEC61 subunit affects APP secretion but not APP synthesis or the abundance inside the cell. Our work provides a first view on early events in APP synthesis and sorting that are crucial for understanding molecular mechanisms of Alzheimer's and other neurodegenerative diseases.

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Exploring the Potential of 10-Butylether Minocycline (BEM) in Alleviating Alcohol Use Disorder: Insights from Varied Models

Alcohol use disorder (AUD) poses a significant societal burden due to its limited treatment options and impact on health and costs. This study tests the hypothesis that 10-butylether minocycline (BEM), a lead compound identified from library of modified minocycline analogs based on safety and efficacy, will reduce high alcohol consumption across the AUD severity spectrum. Murine models tested include: Drinking in Dark (DID), Immune-Induced Escalation (IIE), and Chronic Intermittent Ethanol (CIE), which represents various stages of AUD, including initial binge drinking or mild AUD, escalation phase or moderate AUD and dependence or severe AUD respectively. For DID, BEM reduced alcohol consumption dose-responsively and significantly in both sexes at 20, 40 and 60 mg/kg i.p. BEM reduced alcohol consumption in both sexes given at 60 mg/kg i.p. in the IIE test in poly(I:C) immune challenged animals at the 6 hr time point but not at 24 hours. This was consistent with our pharmacokinetic profile with the calculated half-life in females and males, suggesting an acute action that may need twice daily administration. In dependence models, BEM significantly reduced alcohol consumption in both mice and minipigs. In the mouse CIE test, female and male mice were given 60 mg/kg i.p. following 4 standard cycles of ethanol vapor exposure and limited access drinking. BEM reduced voluntary consumption by 80% with no sex differences. Finally, in a non-rodent swine model, we treated two female minipigs with a history of nearly 3 years of alcohol consumption with at least six of eleven DSM-V criteria, meeting a severe AUD diagnosis. At 10 mg/kg p.o. BEM, a reduction in both alcohol consumption and preference were recorded. These pre-clinical results show BEM may be a promising AUD treatment; it is currently undergoing ADMET testing for an FDA Investigational New Drug application.

NARESH SAH; PAMELA LUNA; CHINNADURAI MANI; ROBERT YOUNG; GANESH ACHARYA; WILLIAM GMEINER; AND KOMARAIAH PALLE

Novel Approaches in Fluoropyrimidine Therapy for Recalcitrant Colorectal Cancer

Introduction: Colorectal cancer (CRC) is a significant cause of cancer-related deaths, often due to treatment-resistant forms. The commonly used chemotherapy drug, 5-fluorouracil (5-FU), has several limitations. To address this, we are developing a novel second-generation, safer, more potent nanoscale FP polymer, CF10, for improved CRC treatment. Methods: We used immunoblotting to identify replication fork and DNA double-strand break markers (FANCD2, pChk1-S317, pChk2-T68, Rad51, pH2AX). Alkaline comet assays and immunofluorescence were used to assess DNA damage after various treatments. Primary colon cancer organoids demonstrated attenuation. TS expression in HCT-116 cells was controlled with the Tet-on system to study its role in CRC metastasis and 5-FU resistance. Invasion and migration assays showed TS's pro-metastatic effects. We're developing a CF10 vs. 5FU resistant/metastatic model. Results: In CRC cells, CF10 effectively inhibited thymidylate synthase (TS), increased Top1 cleavage complex formation, and induced replication stress, whereas identical dosages of 5-FU were ineffective. The CF10 induces more replication stress in rats, mice, human-established cell lines, and primary CRC cells compared to 5-FU. In vivo, we observed that CF10 possesses significantly higher anti-tumor activity when compared with the control. Additionally, CF10 treatment improved survival (84.5 days vs 32 days; $P < 0.0001$) relative to 5-FU in an orthotopic HCT-116-luc colorectal cancer mice model that spontaneously metastasized to the liver. Interestingly, we saw a reduction in metastatic tumors in the CF10 treatment group. We noticed that TS overexpression promoted cell migration and invasion. Strikingly, we discovered that CF10 suppresses the growth of TS-expressing primary CRC organoids, as seen by the reduction of spheroid formation. Conclusion: In summary, CF-10 induces more replication stress than 5-FU, and the overexpression of TS contributes to increased epithelial-mesenchymal markers, migration, and invasion. These findings highlight CF-10's potential for treating resistant colorectal cancers and overcoming 5-FU resistance.

REBECCA SCHNEIDER; KENDRA RUMBAUGH, PHD

Characterization of Pseudomonas aeruginosa biofilm dispersal

Background: Biofilms are microbial survival strategies in which bacteria can surround themselves in a protective and antibiotic tolerant extra-cellular polymeric substance (EPS) composed of synthesized and scavenged carbohydrates, proteins, and extra-cellular nucleic acids. Enzymes that target the EPS of the biofilm to release bacterial cells have gained traction as potential anti-biofilm agents. These released bacterial cells, termed dispersed cells, have been shown to behave very differently from biofilm and planktonic (free-floating) bacteria. However, the phenotypic (behavioral) changes of dispersed cells in preclinical in vivo and ex vivo models is understudied. We hypothesized that bacterial cells dispersed from a preclinical biofilm would have a more virulent phenotype characterized by the upregulation of virulence factors associated with systemic infections. Methods: We evaluated the phenotypic changes seen in dispersed Pseudomonas aeruginosa (PA) infections from our murine surgical wound model. Dorsal 1.5cm2 full-thickness surgical incisions were inoculated with PAO1. Infected wounds were treated with glycoside hydrolase (GH) enzymes that target carbohydrates in the EPS. Phenotypic changes of PA cells dispersed in vivo and ex vivo were assessed with various virulence assays. Results: We used a Galleria mellonella larva model to assess the overall virulence of different PA populations (planktonic, biofilm and dispersed). Our results suggest that GH-dispersed cells display a phenotype that is intermediate between the biofilm and planktonic phenotypes. Further investigation of dispersed cells indicated increased levels of individual virulence factors, including rapid and more robust biofilm attachment. Conclusions: This study provides valuable insight into the behavior of dispersed PA cells. Our findings are crucial to understanding the potential of EPS-targeting enzymes as anti-biofilm therapeutics in acute and chronic wound infections. Future studies will focus the host response to biofilm dispersal in wound infections.

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PHARMACOKINETICS & PHARMACODYNAMICS OF BUTYL ETHER MINOCYCLINE

The present study aims to elucidate the pleiotropic mechanisms of action of 10-Butyl Ether Minocycline (BEM) to treat Alcohol Use Disorder (AUD). We have established the pre-clinical efficacy of minocycline (an antibiotic) in significantly reducing alcohol consumption in rodent models. Minocycline's anti-inflammatory, neuro-protective, and immune-modulatory activity have been long hypothesized to be responsible for its action against AUD and in the treatment of non-infectious conditions. When treating for a chronic condition like AUD, long-term use of minocycline may lead to disruption of microbiota and development of antibiotic resistance. Many of the minocycline's off-target pharmacological actions are not correlated to its anti-microbial activity. To reduce side-effects and to recapitulate the neuroprotective and immunomodulatory activities of minocycline, BEM was synthesized by modifying a functional group responsible for antibiotic activity. We hypothesize that non-antibiotic BEM, our lead molecule, can recapitulate the neuroprotective and immunomodulatory activities of minocycline. FDA Investigational New Drug enabling studies thus far have indicated that BEM is a Bio Pharmaceutical Classification (BCS) class-1 molecule that is well tolerated in mice, rats and dogs. BEM has good water solubility, good permeability and good safety/toxicity profile. BEM showed greater anti-VEGF activity than minocycline using a vascular endothelial cell proliferation assay. BEM also showed suppression of LPS mediated microglial activation better than minocycline in N9 microglial cells. Results of LPS mediated suppression were obtained by immunofluorescence and confirmed by gel electrophoresis. We also show that BEM has better MMP-9 inhibition than minocycline. Pharmacokinetic studies of BEM in male and female mice via oral and intraperitoneal route suggests that it has good blood brain barrier permeability with a mean brain residence time of 5-8 hours. BEM, with its promising efficacy and diverse pharmacological actions, holds potential for treating various neuropsychological disorders, including AUD, providing a novel avenue for drug discovery beyond traditional antibiotic properties.

KERRI SPONTARELLI, STEVEN S. SCHERER, SHAWN J. BIRD, BRETT MCCRAY, AND PABLO ARTIGAS

Functional evaluation of a CMT2DD-causing ATP1A1 variant.

We identified the variant c.1645G>A in ATP1A1, resulting in mutation G549R of the Na+/K+-ATPase's (NKA) α1 subunit in two unrelated patients with Charcot-Marie-Tooth disease, a peripheral neuropathy. Both patients presented with symptoms in their teens, with subsequent slow progression of distal muscle weakness, sensory loss, and areflexia. Clinical electrophysiology confirmed distal denervation, sensory axonal loss, and intermediate slowing of distal motor response. This variant was previously identified in three-generation kindred, but its pathophysiological mechanisms remain unknown. NKA is a heterodimeric $\alpha\beta$ protein that exports 3Na+ and imports 2K+ at the cost of ATP hydrolysis, thereby establishing the electrochemical gradients required for neuronal excitability. We evaluated the function of G549R-α1β1 NKA in Na+-loaded oocytes expressing these subunits using two-electrode voltage clamp. Compared to wildtype, G549R showed ~30% reduction in extracellular K+-induced NKA current (n=24, 5 oocyte batches), resembling previous reports of other CMT-causing variants. The K0.5 for extracellular K+ was minimally increased (~30%, n=6). We measured the ouabain-sensitive transient-charge movement elicited by voltage pulses, to evaluate NKA's partial reactions without extracellular K+. The total charge moved (dependent on the number of functional NKAs at the membrane) was reduced by ~30% in G549R compared to wildtype (n=15), a result consistent with preliminary western blot analysis of plasmalemma-enriched oocyte membrane preparations. The charge-voltage curve shows a small shift, consistent with a ~20% (n=15) reduction of extracellular Na+ affinity. Patch clamp experiments to evaluate intracellular ligand interactions indicate no effect of G549R on ATP affinity. Preliminary results of NKA localization in HEK293 cells using YFP-tagged α1 clones show intracellular localization of G549R-NKA relative to WT-NKA. These results indicate that one of the pathophysiological mechanisms of G549R is its impaired trafficking to, and/or its half-life at, the plasmalemma, reducing the pumping capacity there. Experiments evaluating plausible dominant-negative effects are ongoing.

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MOSHARAF MAHMUD SYED; DEVARAJA RAJASEKARAN; TYLER SNIEGOWSKI; SOUAD SENNOUNE; YANGZOM D. BHUTIA

Combination therapy targeting both SLC6A14 and autophagy and/macropinocytosis for a better therapeutic outcome in pancreatic ductal adenocarcinoma

Our laboratory has established SLC6A14, an amino acid transporter as a novel drug target for pancreatic ductal adenocarcinoma (PDAC). While this is truly amazing, we have also observed that inactivation of SLC6A14 leads to upregulation of autophagy and macropinocytosis, which are nutrient scavenging mechanisms. If this is true, these mechanisms can partly compensate for the loss of amino acids caused by SLC6A14 loss and thereby undermine the anticancer efficacy of SLC6A14 blockade. Therefore, the aim here is to characterize the induction of autophagy and macropinocytosis and to further test whether a combination therapy targeting both SLC6A14 and autophagy and/macropinocytosis will lead to a better therapeutic outcome in PDAC. Using SLC6A14-positive PDAC cell lines, CFPAC-1 and HPAF-II, either in the presence or absence of alpha-methyl-L-tryptophan (α-MLT; SLC6A14 blocker), we have confirmed that indeed SLC6A14 blockade leads to the induction of autophagy as demonstrated by the increase in LC3 protein (Western blotting & immunofluorescence), changes in the phosphorylation status of mTORC1, AMPK and Beclin-1 (Western blotting), as well as well as macropinocytosis as evidenced by the increased uptake of TMR dextran, in the α-MLT treated cells. Furthermore, our in vitro assays (MTT & colony formation) showed that a combination of α-MLT (SLC6A14 blocker) and hydroxychloroquine (autophagy & macropinocytosis inhibitor) significantly reduced the proliferation capacity and the clonogenic ability of these cells, respectively as opposed to monotherapy. Our preliminary mouse xenograft study showed similar data and further analysis of the tumor samples suggested that the observed reduction in tumor volume in the combination group was mediated due to SLC6A14 blockade as well as inhibition of autophagy and macropinocytosis. Our future study involves further validating the mouse xenograft study and corroborating the findings using a CRIPSR-mediated knockout of SLC6A14.

EMILY VANDERPOOL; KENDRA RUMBAUGH, PHD

Interspecies dynamics in a murine sinonasal infection

Introduction: In many chronic infections, bacteria persist in complex communities. As we seek to better understand these infections and pathways to their treatment, we must unravel the contributions of these bacterial community members in their disease context. This means investigating bacteria in disease-relevant polymicrobial communities, rather than solely on an individual species level. Toward this end, we set out to investigate the relationship between three commonly isolated pathogens in chronic rhinosinusitis using a murine model of sinonasal infection. We hypothesized that Staphylococcus aureus (SA) and Pseudomonas aeruginosa (PA) would behave cooperatively in our model, but that adding Klebsiella pneumoniae (KP) to the inoculation would disrupt cooperation. We expected that KP in a tri-species inoculation would be the least likely species to persist when under the virulence pressure of SA and PA. Methods: We tested individual, two species, as well as three species inoculations in the nasal cavities of Swiss Webster mice. 5 days after inoculation, we quantified bacterial load in the nasal cavity using colony forming units. Results: We found that SA and PA appear to behave cooperatively within the sinonasal cavity, as evidenced by similar final bacterial load from both species. However, when we added KP to the inoculation, KP dominated the final population, reducing both SA and PA. Conclusions: This could suggest that KP is able to disrupt the niche selection that occurs in SA and PA dual infections. Even further, this finding highlights the need to continue to investigate complex communities to better understand infection dynamics.

Graduate Medical Education Sciences

MICHAEL A. AMMONS, MSHA; DANIEL R. WEBSTER, PHD; JOHN W. PELLEY, PHD MBA

Optimizing Test Readiness: Exploring the Connection Between MBTI Learning Styles and Question Analysis in Medical Education

PURPOSE
Our primary hypothesis is that the understanding/utilization of QA is low among first-year medical students at our institution. Additionally, we hypothesize that there is a correlation between MBTI learning types and QA.
METHODS
In week 1 of 8 during the General Principles (GPX) block, students received a weekly email including a multiple-choice quiz, a QA mapping tool (QAMT), and an instructional video explaining the QA process. At the conclusion of the block, students were surveyed for multiple aspects related to QA and their MBTI learning type. In this post block survey, two sections of Likert style survey questions were included, the first involving questions derived from the MBTI learning style assessment, and the second regarding QA. A 5-point scale was used to assess the agreeance of each participant to questions related to QA understanding and use. Various statistical methods were used to investigate both hypotheses related to MBTI learning types and QA understanding/utilization.
RESULTS
• Of the respondents (n=43), 75% (n=33) of students report a high level of understanding and utilization of QA (average section 2 score between 4-5). 25% (n=11) of students report a moderate level of understanding and utilization of QA (average section 2 score between 3-4).
• Categorizing responses by learning type group and comparing the level of understanding/use of QA revealed statistically significant differences in each group ($p < 0.01$).
CONCLUSION
QA as a tool for exam preparation is limited in use by its exposure and understanding by medical students. As exposure and awareness to the QA process increases, medical students will be equipped with an additional tool to enhance their studies as well as clinical reasoning skills. MBTI learning styles serve medical educators in preparing medical students for board style multiple choice questions.

MARCOS ARCINIEGA, B.S; DR. BRANDT SCHNEIDER, PH.D.; DR. GURVINDER KAUR, PH.D

Fortifying Medical Education: The Impact of Supplemental, Instructional Lectures and The Use of Formative Exams

Introduction: Recognizing the growing interest in formative assessments and supplemental instructional methods in enhancing learning outcomes, this study aimed to investigate the collaborative impact of high yield review lectures synergized with faculty presentations during the General Principles block at TTUHSC. Specifically, we compared the use of supplemental lectures and formative quizzes to determine if student attendance and formative quiz performance positively correlates with summative exam performance.
Methods: First year medical students engaged in a structured regimen involving pre-quizzes, supplemental high-yield review lectures, and post-quizzes. This study incorporated a 12-question pre-quiz followed by an hour-long lecture that covered the previous week's materials and clinical correlates and a subsequent post-quiz. Students had 24 hours to take the post-quiz which contained rationales for immediate feedback. During the 8-week section of the first-year curriculum, students had access to six pre-quizzes, six one-hour lectures, and six post-quizzes.
Results: Student performance on post-quizzes significantly improved as compared to pre-quizzes for the first 2 out of 3 units (n=45-56, unit 1: 70% vs 81.5% and unit 2: 68% vs 81%). Those that attended the sessions in the biochemistry unit were nearing statistical significance (p=0.06) on performance on the summative exam compared to those who did not. Analysis revealed a positive correlation between post-quiz performance and subsequent summative exam performance (r^2=0.45-0.56, p< 0.001). QIRB #22069
Conclusions: The use of supplemental instruction for pre-clerkship medical students allows for consolidation of the material. In this study, formative assessments positively correlated with performance on the summative assessment warranting further exploration of these approaches within medical education. No difference in the pre- and post-quiz scores in unit three could be from students implementing other resources in their education. Further studies should include questionnaires if students are using third party resources.

MADISON BACHLER; GURVINDER KAUR PH.D.

Go With the Flow: Visualizing Embryological Development with Flowcharts to Supplement Learning

Embryology has been a historically difficult subject for first-year medical students to understand during the Anatomy, Embryology, and Histology (AHE) block. Although various student-generated resources are available to supplement learning, there is a noticeable scarcity of resources to augment embryology comprehension. A needs-analysis survey conducted among second-year medical students from the class of 2026 indicated that 77.7% (n=67) of students believed additional resources could have supplemented their understanding of embryology. Moreover, 73% (n=67) of students rated their perceived difficulty of AHE embryology material at 6 or higher on a 1-10 scale. We hypothesized that developing an active-learning resource, specifically embryology flowcharts, would improve both student comprehension and performance in the realm of embryology material.
Starting each week of AHE, students received fillable flowchart templates aligning with embryology lecture content for that week. At the end of the week, a mini-quiz comprising 10-15 questions was released accompanied by answer rationales for prompt feedback. The subsequent week, faculty-vetted, completed versions of the flowcharts were provided to students for comparative analysis with their individually-filled flowcharts. Preceding each unit exam, a comprehensive quiz, encompassing questions from the preceding weekly quizzes for that unit, was provided to students with respective rationales.
At the beginning of AHE, 72% (n=99) of students were either unfamiliar or somewhat familiar with embryology content. During AHE, 62% (n=47) of students incorporated flowcharts as a resource during review periods without access to lecture notes or slides, while 11% utilized this resource during both lectures and review periods. Student (n=31-99) performance on post-quizzes significantly improved as compared to pre-quizzes (unit 1- 63% vs 78%, unit 2- 52% vs 73%, unit 3- 70% vs 82%; p<0.001). Overall, the data suggests that utilizing flowcharts as an active-learning embryology resource enhances both student understanding and performance, especially in establishing strong comprehension of foundational embryologic concepts.

NAJAH HUSSAIN; DR. BEVERLY CHILTON; DR. GURVINDER KAUR

Histology reinvented: Bridging theory and practice in reproductive workshops for enhanced learning

Background: Traditionally, histology education relied on microscopes and glass slides, but the evolving landscape of medical education recognizes the need for change. Modern learners demand more engaged resources, prompting educators to embrace hands-on learning approaches for increased relevance and impact. At TTUHSC, the Organ Systems 4 block focuses on reproductive histology, physiology, and pathophysiology. In this block, we initiated workshops aimed to illustrate the relevance of histology through an immersive, hands-on learning experience. We hypothesize that supplementing traditional histology lectures with clinical practice and case-based learning would enhance student understanding of reproductive histology/histopathology and refine their application skills.
Methods: Two selective workshops for second year medical students, each centered on either male or female reproductive organs, were organized. In the female workshop, students rotated among various stations engaging in hands-on learning with manikins and ultrasound simulations. Two stations featured lecture-based histology presentations with pathology. Post-session, students were provided with case studies on common reproductive disorders to foster clinical reasoning. The male workshop began with a lecture-based presentation on histology, pathologies, and ultrasound, followed by group collaboration on case studies to reinforce practical application. Of 173 students, 70 indicated that they attended either one or both workshops.
Results/conclusions: In the post-block questionnaire, 66% of students (n=120) found the case-based approach highly effective in enhancing understanding of reproductive organ physiology/pathophysiology. Furthermore, 78% of students felt competent in applying workshop-acquired knowledge to practical scenarios, such as summative exams and clerkship rotations. An overwhelming 88% of students credited the workshops with notably improving their comprehension and application of the clinical histology relevance. The data strongly indicate that supplemental instruction, incorporating clinical skills practice, histology reinforcement, and case studies, enhances student understanding of reproductive physiology and pathology. The workshops' success underscores the potential for transformative teaching methods in histology education.

WESTIN KLEIN; DR. BRANDT SCHNEIDER; DR. GURVINDER KAUR

Cadaveric Image Quizzes: A Practical Examinee's Best Friend

Introduction
Practical cadaver-based examinations are a large part of the assessment of first year medical student's anatomy block. Incoming medical students have limited experience with cadaveric anatomy and as such practical exams can be difficult and stressful.
Hypothesis
Increased exposure to formative cadaveric image-based questions will improve student confidence and test scores.
Methods
At the beginning of each week, all students were emailed a voluntary, anonymous, untimed 15 multiple choice question pre-quiz. At the end of each week, a post-quiz with the same format was made available. Each quiz could only be taken once. Each practice quiz question resembled the structure and content of actual exam questions. Student performance on pre- and post-quizzes was evaluated. A total of 12 quizzes were administered over the span of 6 weeks. At the conclusion of this project, students were asked to assess the effectiveness of this project in a subjective questionnaire.
Results
For the students that participated in this project, average post-quiz scores (70.8%) improved significantly ($p < .05$) as compared to pre-quiz scores (48.9%). In an end of block survey, students (n=188) ranked this project the 10th (out of 21) most effective learning resource for anatomy. Additionally, an overwhelming majority of students (93.9%) reported that this project was highly effective at preparing students for cadaveric practical exams.
Conclusions
Utilization of cadaveric image-based practice questions improve student confidence and preparation for practical exams.
Limitations
Multiple resources were available for students to prepare for practical exams. Individual improvement could not be assessed in this anonymous model.
Future Directions
Track individual quiz-takers scores that completed both the pre and post quiz to further investigate dissector or reviewer improvement on summative practical exams.

WILLEM NORTHCUT, GURVINDER KAUR PH.D., BRANDT SCHNEIDER PH.D.

Optimizing Education: Anatomical Model-Based Videos are an Effective Learning Resource and Reduce Student Stress

Introduction and Objective: The use of anatomical models in medical education is ubiquitous and can provide an efficient resource to medical students as they begin undergraduate medical education. This study aimed to utilize anatomical models to deliver concise instructional videos covering anatomy, embryology, and related clinical correlates that the students can watch to aid in exam preparation.
Materials and Methods: In this study, relevant anatomical models were used to make short instructional videos (an average duration of 9 minutes). Over the 10-week course of Anatomy, Histology, and Embryology (AHE) block, a total of 10 videos were distributed to the students. Each video was accompanied by pre- and post-quiz questions covering similar topics and difficulty levels. These quizzes assessed student knowledge and evaluated content delivery. Additionally, qualitative questions were distributed with each video to discern if the students thought the videos were useful and helped to reduce stress during exam preparation.
Results: In an end-of-block survey, 93.3% (n=30) of responding students “agree” or “strongly agree” that this resource helped to reduce general stress during the AHE block. Additionally, students (n=188) ranked these videos the 6th (out of 21) most effective learning resource available to them. After watching the videos, student post-test scores improved significantly in all units as compared to the pre-quiz scores. For example, unit 1 score averages increased from 75.6% to 80% correct (P value < 0.0001) and unit 2 averages increased from 75% to 86.5% correct (P value < 0.0001).
Conclusion: Students found the instructional videos to be an effective study tool and at the same time reduced student stress during the AHE block. The feedback received from students was overwhelmingly positive, with many expressing their desire for additional videos to be created to accompany the current ones.

ANANYA POTU; CASSIE KRUCZEK, PHD

Digesting the Alphabet Soup: Combining Resources to Promote a Conceptual Understanding of Immunology

Introduction
At the Texas Tech University Health Sciences Center School of Medicine (TTUHSC SOM), students are taught Immunology as part of the Organ Systems 1 block in the second semester of their first year. A needs assessment administered in spring of 2023 to year one medical students (MS1, Class of 2026) revealed a need for additional resources within the Immunology unit. Specifically, of 49 survey responses, 63% reported facing challenges in grasping mechanisms in which innate immunity and adaptive Immunity work together, and 51% reported difficulties in comprehending B and T cell development. Based on these results, several new resources related to these topics were created. It is our goal that a combination of supplemental resources enhances student learning and application of topics related to the Immune system.
Methods
To promote active learning and a conceptual understanding of B and T cell development as well as the integration of innate immunity and adaptive immunity, three detailed note guides, three fillable concept maps, and two practice online quizzes were provided to a subsequent class of MS1 students (Class of 2027). As the 2024 rendition of Organ Systems 1 is currently underway, a student satisfaction survey has been released following the recent conclusion of the Immunology unit. Results regarding student performance and satisfaction are currently being gathered and evaluated.
Results/Conclusions
Current results indicate 95.5% of 45 survey respondents expressing that at least one of the provided resources promoted active learning and a conceptual understanding of specific Immunology topics. Similarly, 95.6% of respondents expressed that using one or more of the provided resources helped with retention and/or recall while taking a summative assessment. Overall, recent results indicate high levels of student satisfaction in utilizing the provided supplemental resources, and further results regarding effects of practice quiz utilization on student exam performance will be assessed.

JACOB ROBERTS; GURVINDER KAUR, PH.D.;BRANDT L. SCHNEIDER, PHD

Participation in Cadaveric Dissection and Its Impact on Learning.

Introduction:
The Texas Tech University Health Science Center medical-school integrates cadaveric dissection into its Anatomy, Histology, and Embryology course. Students work in groups of six per cadaver, further divided into A and B groups. While one group engages in hands-on dissection, the other reviews the dissection, alternating responsibilities during each lab. The study aimed to assess whether engaging in cadaveric dissection enhances students' understanding and performance on related anatomical concepts, hypothesizing that participation in dissection would improve quiz scores associated with each lab.
Methods:
Quizzes, consisting of five multiple-choice questions, were administered before and after each dissection. The results were collected anonymously, and students indicated their group affiliation (A or B) to denote participation in dissection or review. Over three-weeks, a total of 20 quizzes were administered. The project's effectiveness was assessed through a Likert scale survey conducted at the study's conclusion.
Results:
The student satisfaction survey revealed a positive response, with 81.5% rating the quizzes 8/10 or higher, indicating a strong endorsement for recommending this resource to future students. Iin an end-of-block survey involving 188 participants, the quizzes were ranked higher as a learning resource (15th out of 21) than the recommended textbooks. Despite the positive impact on student learning, no significant difference in post-quiz scores was observed between dissector (64%, SD±16.5, n=21) and non-dissector/reviewer (61%, SD±11, n=15) groups. While both groups exhibited a slight improvement in post-quiz performance (pre-quiz: 62%, SD±11 and post-quiz: 64%, SD±13, n=30).
Conclusion:
Despite the absence of improved student performance on post-quizzes, the overall positive student response underscores the perceived value of this resource in the learning process. Future studies could delve into the impact of additional learning resources on student performance in the anatomy course.

VALERIA MUCHARRAZ, MBA ; DR. CASSANDRA KRUCZEK PHD

Listen Up: Utilizing Podcasts as a Medium for Efficient On-the-Go Content Review

Introduction
A comprehensive needs assessment was conducted among the Texas Tech University Health Sciences Center School of Medicine Class of 2026 during spring 2023. Out of 61 participants, over 50% expressed a strong desire for a podcast as an additional learning resource to support their studies in anatomy, histology, embryology (AHE), and general principles (GPX). Based on the results of the needs analysis, a podcast series was developed that spans the first two blocks of the curriculum and addresses specifically identified topics.
Methods
The targeted learners are current first-year medical students (MS1, Class of 2027). The initial episode within the AHE block served as a block introduction to clarify expectations. Subsequent episodes covered high yield clinical correlate topics for each unit. Students could listen to podcasts while performing other activities, such as working out. Overall, the AHE series consisted of four episodes, including the introductory episode, and three clinical correlate episodes which aligned with specific units in the AHE curriculum. Content for clinical correlate episodes was based on heavily emphasized topics during AHE sessions. Each podcast episode was made available to students a week before the respective exam to provide ample time to review and use the podcasts as supplemental learning tools. For the GPX podcast series, topics including vitamins, antibiotics, and medical genetics were included as they were identified as most useful by the previous cohort of MS1 students (Class of 2026).
Results/Conclusion
Students have reported positive outcomes from utilizing the podcast series. 81% of survey respondents (n=79) following the AHE block either agreed or strongly agreed that the podcast was a useful resource and that they would recommend the podcast series to others. These results suggest that the podcast-based approach enhances review of material and contributes to a healthier work-life balance for students, supporting overall well-being.

ALHELÍ ROMERO; KEITH BISHOP PH.D., TTUHSC DEPARTMENT OF MEDICAL EDUCATION

MARMU and More: Understanding the Impact Anatomy Mnemonics Sheets Have on First-Year Medical Students

Introduction
Mnemonics are learning tools that create connections between new information and existing mental cues. Anatomy mnemonics are widely embraced in medical education as they increase comprehension and retention in a setting that rapidly introduces extensive material. Previous literature has showcased how mnemonics were effective in increasing anatomy test scores and enhancing the skill of differential diagnosis. At Texas Tech University Health Sciences Center (TTUHSC), first year medical students in the Anatomy Histology and Embryology (AHE) block have shown notable use of mnemonics.
Aim
The purpose of this project was to understand the impact of faculty-vetted mnemonic sheets curated to the specific needs of the course on students' educational and mental wellness in the AHE block.
Methods
After determining the most favored mnemonics from previous cohorts and faculty lectures, sheets were created to include the mnemonic, an explanation, and a description of it's integration within the curriculum. The sheets were laminated and available in the dissection lab and online. Pre and post quizzes made of questions relevant to the mnemonics page content were sent to students early in each unit and just prior to each of the three exams. Upon completion of the block, a comprehensive survey gauged utilization, satisfaction, and impact.
Results
Qualitative data obtained from 67 post block survey responses highlighted prominent utilization (95.6%), high rate of satisfaction (98.5%), and positive impact on reducing or lessening the student's levels of anxiety (77.6%) with regards to the course. Quantitative pre and post quiz data were observed to be statistically significant ($p<0.0001$) for all three units.
Conclusions
Overall, this project allowed us to provide a concise, accessible resource that students could use for helpful learning tools, gaining confidence, and clarification in different study settings.

SATHYAK SAINI; DR. WEBSTER, PHD

Enhancing Histology Learning in Medical Education: The Impact of a High-Yield Fact Sheet

PURPOSE
This project investigates the effectiveness of a high-yield fact sheet (HYFS) designed to enhance Histology learning of first-year medical students during the Anatomy, Histology, and Embryology (AHE) block at Texas Tech Health Sciences Center. Specifically, this study aims to assess the impact of the HYFS on student performance and gather quantitative and narrative feedback on its utility.
METHODS
First, we distributed a needs-analysis survey to the previous year's medical school class and the responses revealed a great demand for additional resources in Histology. Second, we prepared a pre-quiz with five content-based questions that was administered before students accessed the HYFS. The HYFS itself, a comprehensive and targeted list of high-yield concepts, was developed. Lastly, a post-quiz which included the same objective questions along with new subjective questions, was conducted 12 weeks later. The subjective questions asked how much time the students spent utilizing the HYFS and the primary method in which they used it to study.
RESULTS
The pre-quiz mean score of 3.03/5 improved significantly (p-value: 0.009) to a post-quiz mean of 3.76/5, and the median performance increased from 3/5 to 4/5. Student performance on AHE exams showed modest improvement from the previous year. Additionally, 76% of post-quiz respondents stated that the Histology HYFS was helpful for reviewing material during AHE. These data affirmed the positive impact of the HYFS on histology learning outcomes.
CONCLUSIONS
This research underscores the significance and effectiveness of using targeted resources in enhancing medical education and provides useful insights into the potential of HYFS to meet student needs and supplement pedagogical approaches in medical education.

PATRICK THOMPSON; GURVINDER KAUR, PHD

Space bars and fast cars: Anki usage effect on AHE scores and quality of life

Background
46.2% of medical students sometimes or never attended in-person lectures, and 28.7% of students sometimes or never watched online lectures (AAMC 2022). This shows a significant portion of students rely on third-party resources as their primary source of information, for example, Anki. Anki has proven to be an effective tool for achieving success in pre-clerkship education, as evidenced by studies conducted by Landoll et al. (2021) and Gilbert et al. (2023). This study focused on exploring whether there is a correlation between the summative exam performance and well-being outcomes of first-year medical students based on their anki usage.
Methods
A comprehensive Anki deck was distributed to incoming medical students at the TTUHSC during the Anatomy, Histology and Embryology (AHE) block. This deck was made to limit the variance of students using different Anki decks. Following AHE, students were surveyed to self-report their anki usage and assess their quality of life. In-house exam and NBME grades were then compared for anki vs non-anki users.
Results
No significant difference was observed between Anki users and non-anki users on unit exams (88% versus 88.4%, p=0.72) or the NBME (82% versus 83%, p=0.77) in AHE. Non-Anki users stated they had more time to pursue interests outside of school with no other major differences in surveyed quality of life metrics.
Conclusions/ future directions
Anki usage did not correlate with summative exam performance and non-anki users had more time to pursue interests outside of academics which may contribute to improved quality of life. Future studies analyzing the learning style of dedicated Anki users vs non-anki users could be interesting.
Limitations
Anki usage was self-reported by students. While a comprehensive Anki deck was provided, students' usage could not be controlled. Lastly, we obtained a small sample size of non-anki users which makes extrapolation challenging.

School of Medicine, year 1

GAURAV AGRAWAL, BA; RYAN WEALTHER, MD; ETHAN MATTHEW, MD; HELEN CHEN, MD; CLOYCE STETSON, MD; ASHLEY STURGEON, MD

Look twice before you Mohs, watch out for collisions!

Introduction: Collision lesions between seborrheic keratoses (SK) and skin malignancies are an uncommon phenomenon and present a challenge in diagnosis and treatment. In a retrospective study, less than 1% of histologically diagnosed SKs were found in direct contiguity with a malignancy.
Methods: We present a case of an SK-basal cell carcinoma (BCC) collision lesion and an SK-squamous cell carcinoma (SCC) collision lesion in a 76-year-old male with a history of multiple skin cancers. The patient received Mohs surgery to treat both lesions.
Results: The direct contiguity between SK and BCC was only noted on the first stage of Mohs surgery of the patient's right neck, while direct contiguity between the SK and SCC was only noted on the shave biopsy of his left occipital scalp.
Conclusions: This case highlights the need for clinicians, dermatopathologists, and Mohs surgeons to avoid anchoring bias in the presence of benign pathology and to remain vigilant for collision lesions.

MADISON BARR, KHAJA SIDDIQUI, AKSHAY RAGHURAM, JAD ZEITOUNI, DOUGLAS BETTARELLI, COURTNEY TYLER, RINA LITTLE, ANDRES PERALTA, ARIEL SANTOS, ELISABETH CONSER

Fostering Medical Student Wellbeing through the Art and Wellness Workshop: A Collaboration Between the Texas Tech University School of Art and the School of Medicine

Introduction: The Texas Tech University School of Art and the Texas Tech University Health Science Center School of Medicine aimed to enhance medical student well-being through the Art and Wellness Workshop, recognizing the profound impact of art and wellness techniques on stress reduction, improved self-esteem, and enhanced self-awareness.
Research has shown the effectiveness of art wellness interventions in populations facing academic pressures and emotional difficulties. Integrating art wellness workshops allows students to engage in creative processes and develop practical tools for self-reflection, emotional processing, and personal growth.
Methods: Two workshops, each with 20 medical student participants, utilized acrylic painting, a guided writing exercise, and group discussions on students' lives inside and outside of medicine as forms of expression. To assess impact, a post-survey with Likert scale questions and open-ended responses was administered.
Results: Survey findings revealed unanimous agreement (100%) on the workshop providing a safe space for artistic expression and self-reflection. The majority strongly agreed (85.7%) that the art techniques taught were practical for self-care. Participants reported enhancements in self-awareness, emotional resilience, and stress management (85.7%). Positive impacts on overall well-being (85.7%) and creating a culture of wellness within the School of Medicine were noted. 71.4% strongly agreed on the relevance of workshop content, while 85.7% found guided expressive arts techniques helpful for self-reflection.
Conclusion: Participants recommended the workshop (85.7%) and expressed interest in more sessions (85.7%). The workshop positively influenced confidence in applying wellness techniques (71.4%) and connectedness to the medical school community (42.9%). Open-ended responses highlighted stressors, coping strategies, and the positive influence of the workshop on well-being, self-awareness, and coping with medical education stressors. Findings suggest that art wellness workshops significantly contribute to medical student well-being. Recommendations include integrating creative activities into already existing mandatory wellness sessions for a more comprehensive approach to student wellness.

ELIZABETH BRYANT; ANDREW IBRAHIM; ANASTASIA KIM

Factors Preventing Low-Income Community Engagement with Nutrition and Wellness Resources

Introduction
Engaging low-income communities with nutrition and wellness resources can be challenging due to a variety of factors that have yet to be fully explored. Local providers of nutrition counseling resources and financial aid resources perceive the former to be underutilized in comparison to the latter. Addressing these factors requires a multifaceted approach that considers the unique barriers faced by low-income communities. This study seeks to understand potential underlying factors, which involve time constraints, prioritization of needs, and a lack of health literacy and education.
Methods
We interviewed local providers of free nutrition and wellness services and conducted literature searches to examine nutrition programs, the barriers they observe to use of their services, and how they encourage use of their services. The future implementation stage will involve partnering with a community agency that provides nutrition and wellness services to try methods we believe will improve engagement with these services, and measuring how effective these changes are.
Results
We observed qualitative disparities in usage of free nutrition and wellness services as understood by local resources and studies from around the country. We also compiled a list of underlying factors behind this phenomenon as understood by the providers of said services, the opinions of their clients, and other researchers, including time constraints and lack of direct financial benefit during challenging times. Positive influences on engagement with nutrition resources include incentives/prizes and referrals from a physician.
Conclusion
Our work suggests that low-income community members are less likely to engage with nutrition and wellness services than they are to engage with financial aid and direct benefit resources. It seems that nutrition resources are underutilized and underprioritized on the whole due to a variety of above listed factors.

ESTHER BURNS; VIVIE TRAN; MINNIE TRAN; CAEZAAN KESHVANI; DR. PANG; DR. SCOTT O'BANION; DR. GRISWOLD

Outcomes Following Short-Term Administration of Total Parenteral Nutrition to Burn Patients

Introduction
Total parenteral nutrition (TPN) delivers essential nutrients via a central venous catheter, often necessary for patients with compromised gastrointestinal function or those needing bowel rest. Burn patients need balanced nutrition for optimal healing, yet meeting their dietary needs poses challenges, amplified by TPN-related concerns like infection risks and high costs. Despite these challenges, exploring TPN's potential benefits is crucial due to the prevalence of malnutrition in burn patients and the decreasing cost of TPN.
Methods
In our pilot study, we conducted a retrospective analysis on 20 burn patients (aged 18 to 89) recovering from burns over 20% total body surface area, between January 1, 2022, and January 1, 2023. Excluding pregnant patients, those with chronic alcoholism, or emergent cases, we divided the cohort into two groups: 10 received TPN, and 10 did not. Both groups were similar in age, comorbidities, and TBSA percentage. We compared outcomes, including mortality rates, total protein levels, length of stay, and infection occurrence, using nonparametric analysis for significance.
Results
In our study, TPN administration varied widely among patients, ranging from 4.6% to 57.1% with an average of 17.7%. There were no significant differences in pre-albumin levels, total protein levels, electrolyte profiles, length of stay, or mortality rates between the control and experimental groups. Additionally, the TPN group did not experience a significant increase in infections, according to our analysis.
Conclusion
In conclusion, TPN administration appears promising for meeting the nutritional needs of malnourished burn patients, showing no apparent infection risk in our pilot study. However, it's important to note the study's limitations, including its small sample size and localized scope. A larger study is needed to provide more comprehensive and generalizable results, offering a deeper understanding of TPN outcomes for burn patients.

KATIE CHEN; VIVIE TRAN; MINNIE TRAN; ROBERT HORN, M.D.; SHABNAM REHMAN, M.D.

A Case of Essential Thrombocythemia Turned to Chronic Myelogenous Leukemia

Introduction: Negative BCR-ABL gene myeloproliferative neoplasms (MPNs) include polycythemia vera (PV), primary myelofibrosis (PMF), and essential thrombocythemia (ET). The presence of BCR-ABL is a core diagnostic criterion for CML and helps separate it from the aforementioned MPNs. There are very few clinical cases that report ET progressing to CML. This report describes a case of CML development in a patient who was initially diagnosed with ET.
Methods: A 49-year-old male was diagnosed with ET in December 2018. Testing showed normal iron panel, non-reactive Hepatitis C (HCV), Hepatitis B (HBsAg and HBcAb IgG/IgM), and negative BCR-ABL1.
Results: In March 2022, our patient was discovered to have a rising white blood cell count as well as presence of nucleated red blood cells (NRBCs) in peripheral smear, and concern for disease progression, which was inconsistent with his previous diagnosis of ET. Decision was made to obtain another bone biopsy. This showed with positive BCR-ABL gene. He was started on imatinib and is currently responding well to treatment.
Conclusions: This case highlights the necessity of reevaluation in patients with MPN who experience sudden change in their blood counts. In addition to diagnosis confirmation, these tests allow for prompt diagnosis and therefore effective treatment, as the BCR-ABL negative and positive diseases require different management.

MOHAMMED RAIYAN CHOUDHURY, AMNA HAQUE, RAZAN HUSSEIN, MUSA IMAM, SAMEER NOOR, MOHAMAD ALTABAA, MAAMOON MIAN, DR. SEUNGWON CHOI PHD, DR. CHWAN-LI SHEN PHD

Perceptions of Medical Students in the Usage of Complementary and Alternative Medicine (CAM): A Literature Review

Introduction: Complementary and Alternative Medicine (CAM) encompasses a diverse range of medical systems, methods, and practices, which are increasingly sought out for their potential to complement conventional treatments and promote holistic well-being. The current research study aims to understand the scientific literature with regards to evaluating the knowledge, attitudes, personal usage, and potential integration of select CAM modalities into clinical management by medical students. The goal of this study is to understand how these future healthcare professionals perceive CAM in relationship to clinical practice. Methods: Adopting a literature review study design, the research will be conducted with over 20 articles to collect qualitative data on students' familiarity with, perceptions of, attitudes towards, and utilization of select CAM modalities in clinical management. The research methodology will incorporate qualitative elements, including thematic analysis of the literature review, to gain deeper insights. Results and Conclusion: The data for this project is still being collected, and the final results and conclusion for this project will be done before Student Research Week 2024. The results and conclusion of the updated, comprehensive literature review will be presented at Student Research Week.

CAROLINE CUSHMAN, B.S.; ANDREW IBRAHIM B.S

Roux-en-Y Hepaticojejunostomy Procedure Employed to Fix Rare Biliary Duct Anomaly

Introduction: Atypical bile duct branching patterns represent one of the major causes of iatrogenic bile duct injury (BDI) during laparoscopic cholecystectomy (LC) and remain one of the most devastating complications. They usually occur as a consequence in misidentification of the biliary tree due to anomalous branching patterns. The anomalous drainage of the right posterior sectoral duct (RPSD) into the cystic duct is extremely rare and is estimated to occur in 2% of people. This exceptional anomaly signifies an exceedingly uncommon and perilous bile duct arrangement, making it highly susceptible to injury during routine procedures like LC.
Case Presentation: A 29-year-old woman arrives at the emergency department (ED), complaining of epigastric abdominal pain that radiates to the back. One month later, during a follow-up examination, ultrasonography revealed the presence of a gallbladder calculus with a thickened wall and trabeculated mucosa consistent with acute cholecystitis. Subsequently, a cholecystectomy procedure was conducted. After the procedure persistent abdominal pain and distention occurred. The presence of retained intra-abdominal infected subhepatic biloma with air fluid level and moderate ascites suggested a probable leak in the biliary system. A fluoroscopy-assisted abscessogram was conducted. The procedure confirmed the ligation of an aberrant RPSD directly attached to the cystic duct during the cholecystectomy. Shortly after, a percutaneous cholangiogram (PTC) of the right biliary duct was conducted, accompanied by the placement of a biliary drain in the RPSD to facilitate access for the Roux-en-Y hepaticojejunostomy procedure. The patient currently possesses a surgically constructed double common bile duct (DCBD).
Conclusion: Conducting preoperative and intraoperative evaluations of the biliary duct and mindfulness of variations in aberrant biliary ducts are essential preventive measures to avoid bile duct injuries. Employment of interventional radiology guided Roux-en-Y hepaticojejunostomy procedure provided a definitive surgical solution for the biliary tree anomaly.

AKASH DEV, MBA; SUYASH JAIN, MBA; SHRUTI PATEL, MBA; REBECCA JOSEPH, ELISE BOLIN, KELLY MITCHELL, MD

Comparison of Portable Autorefractors to Traditional Refraction by an Ophthalmologist for Determining Refractive Error: A Preliminary Report

Introduction
Uncorrected refractive error negatively impacts many individuals worldwide by limiting educational and vocational opportunities. However, routine eye exams and access to corrective lenses present significant barriers in underserved communities. Portable autorefractors may allow quick, affordable assessment of refractive error through vision screening campaigns.
Methods
This study evaluates the GV2020 Vision Kit and EyeQue VisionCheck by comparing them to clinical subjective refraction performed by an ophthalmologist. We will enroll 50 adult patients from an ophthalmology clinic. Eligibility criteria includes age over 18 years and absence of prior ocular surgery/disease influencing refraction. Each patient will be tested with both devices and a phoropter. The order will be randomized to prevent bias.
Results
Key outcomes are the differences in mean spherical equivalent power and cylindrical measurements across modalities. Bland-Altman analysis and paired t-tests will quantify agreement. The proportion of device readings within 0.50D and 1.00D of clinical values will also be analyzed. Additionally, patients will provide feedback via survey on comfort, ease-of-use, and preference.
Conclusion
If portable autorefractor results prove sufficiently accurate, their convenience and transportability may allow expanded access to identification and correction of refractive error through community vision screening initiatives globally.

SEENA FIROUZBAKHT; SUBASH SWARNA; VIVIE TRAN; MOHAMMAD M. ANSARI, MD

Applicability of Viabahn Covered Stent in The Treatment of Severe PAD-CLI Involving Iliac and Popliteal Artery Complicated by Aneurysmal formation with Sub-Intimal Tear

Background
Percutaneous endovascular intervention is becoming the first-line acceptable treatment for PAD. Endovascular intervention utilizes technology to remove atherosclerosis in peripheral arteries and reestablish blood flow in hypoxemic areas of the vasculature. However, during access with a catheter, a aneurysm in the distal vasculature may form as a complication. Aneurysms must be treated immediately as rupture will cause hemorrhage. With the advancement in technology, now invasive treatment utilizing a covered stent such as the Gore Viabahn is preferred over open-surgical intervention to repair these pseudoaneurysms.
Case Presentation
Female-age 84-year-old with PMH of severe PAD-CLI, HTN, HLD, abdominal aneurysm, pulmonary embolism, and s/p CABG. Patients presented to the ER with lower extremity toe gangrene and decreased mobility due to severe stenosis of the left common iliac artery. The iliac artery lesion was accessed, angiogram demonstrated an aneurysm and stenosis of the iliac artery. An Ultraverse balloon was utilized for the measurement and mini-dilation for stent placement. After which, a stent was deployed, followed by which, popliteal lesion was crossed with questionable sub-intimal, and so Gore Viabahn covered stent was utilized in this area. After treatment, severe peripheral artery disease status-post intervention to left CIA and popliteal arteries showed excellent results. Repeat angiogram of the distal SFA and popliteal artery proofed successful intervention with resolution of the aneurysm, stenosis, and no evidence of dissection, perforation, or distal embolization.
Conclusion
Our case demonstrates the utilization of a covered stent such as the Gore Viabahn can be an effective and safe strategy for endovascular repair of aneurysms due to iatrogenic complication, sub-intimal tear and stenosis. Our case also demonstrates the safety of the procedure for handling complex lesions with covered stents when needed in the extreme bending and mobile territory of popliteal artery, at times the only option.

MARK GAO; FRANCIS KHUONG; ZANE PENA; ADAM YASIN; DR. LARA JOHNSON, MD, MHS

Impact of a Patient-Centered Care Organization on the Mental and Overall Health of Cancer Patients

Introduction:
Cancer patients face not only a wide array of physiological symptoms but also social and psychological challenges. It has recently been found that more than half of cancer patients encounter feelings of social isolation throughout the course of their condition. Cancer-related loneliness has previously been linked to physiological symptoms (i.e., pain, fatigue, and cognitive complaints), directly affecting both patients' quality of life and outcomes. JoyCentric Organization, a charity, volunteer-based non-profit organization, has established outreach programs to tackle and help mitigate these challenges for cancer patients at the Joe Arrington Cancer Research & Treatment Center (JACC). We will evaluate the effectiveness of these efforts in addressing social isolation in cancer patients, to make suggestions that might improve patient outcomes. We predict that engagement in JoyCentric activities will result in a beneficial impact on the health of cancer patients.
Methods:
This study employs a patient-centric approach, using an anonymous survey to assess the impact of JoyCentric's activities on JACC cancer patients. The survey will contain diverse, open-ended questions, aiming to capture qualitative insights into patients' experiences and perceptions regarding the effectiveness and impact of JoyCentric initiatives. Participation is voluntary, emphasizing confidentiality to ensure authenticity. Thematic analysis of qualitative data will uncover recurring patterns, providing insights into the impact of this organization's initiatives and presence. A comparative analysis will distinguish the responses of actively engaged participants from non-engaged participants.

Conclusion:
Previous research and firsthand accounts substantiate our expectation that JoyCentric's efforts will positively influence the well-being and health of cancer patients. This reinforces the significance of addressing social isolation in oncology and enhancing overall patient care. This and future studies may allow for the implementation of similar organizations or strategies, aiming to enhance the overall health and quality of life of cancer patients.

JOSELIN GARICA, VISHAL BANDARU, COLTYN WAGNON, KATE SERRALDE, ROHAN PENDSE, DOUGLAS BETTARELLI, VIVIE TRAN, HAYDEN MEEKS, MELISSA PIEPKORN MD

Title: Designing a 3-Dimensional Congenital Heart Defect Model with an Atrial Septal Defect, Ventricular Septal Defect, and a Patent Ductus Arteriosus

Introduction
The advent of three-dimensional (3D) printing technology has revolutionized the health sector. Adding 3D congenital heart disease (CHD) models improves education. We set out to build CHD model that could depict an atrial septal defect (ASD), a ventricular septal defect (VSD), and a patent ductus arteriosus (PDA).
Methods
The team partnered with the 3D printing lab on campus and a grant was submitted for 300 dollars for supplies to print the 3-D model. All software used was open source: 3D slicer, 3D Builder, and Tinkercad were all utilized in model building and learning. An anonymous adult heart chest computerized tomography (CT) provided by the 3D printing lab was utilized. The process of making the model starts by transferring a CT DICOM file to an open-source software called 3D slicer. The stl file is then transferred from 3D slicer to another software called Microsoft builder, where cuts can be made and connection devices can be added to produce a functional learning model.
Results
A 3D model of the heart was created with 4 separate pieces with 3 CHD modeled in the defect. All three CHD are modeled by different color cylinders to represent their location. Pegs were set orthogonal to each of the piece sides to allow the pieces to fit. Visualization of the septal defects have removable cylinders placed for emphasis and the PDA has an insertable cylinder placed for differentiation by color.
Conclusion
The model can potentially assist in medical education and patient education. Additionally, the normal features of the heart such as the vena cava and pulmonary arteries are observable. We plan to utilize this tool to teach incoming first year medical students. We have also discussed providing additional CHD models to neonatologists, pediatricians, and other physicians.

KURT GRABOW, BS; DOUGLAS BETTARELLI, BS; KHAJA SIDDIQUI, BS, MPH; VISHAL BANDARU, BS, MS, MBA; SENJA COLLINS, PT; ALAN PANG, MD; DEEPAK BHARADIA, MD; JOHN GRISWOLD, MD; JOHN NORBURY, MD

AM-PAC Six-Clicks as an Predictive Measure for Burn Patients Disposition Outcomes

Introduction:
Burn injuries often require complex treatments plans, multiple surgeries, and extensive therapy. Traditionally, predicting outcomes in burn units has been a challenge as length of stay (LOS) and discharge disposition do not always correlate well with the initial Total Body Surface Area (TBSA) burned. The Activity Measure for Post-Acute Care (AM-PAC) is a score for patient mobility on a scale of 6 to 24, a greater score indicates better mobility; during evaluations, a physical therapist assesses mobility in six tasks, each scored from one to four. By combining admission AM-PAC scores with TBSA percentages, the new predictions may give patients and families a better estimation of recovery times.
Methods:
A retrospective chart review was conducted for patients admitted to the UMC Burn Unit between January 1, 2021, and December 31, 2022. Patients were divided based on their discharge outcome, mortality, home with or without health support, or rehab and skilled nursing facilities.
Results:
Patients that experienced (n=12) in-hospital mortality had an average six-clicks score of 7.08 and average LOS was 13.01 days. Patients discharged home, with or without home health support (n=91), had a higher average six-clicks score of 14.51 and an LOS of 19.1 days. Those discharged with home health (n=6) had a notably shorter LOS at 8.98 days. In contrast, 47 patients were discharged to rehab or skilled nursing facilities, displaying an average six-clicks score of 8.94 and an extended LOS at 38.1 days.
Conclusion:
Patients with six clicks score less than half of the maximum possible score on admission showed an expected length of stay greater than 40 days or a mortality rate of 16%. Fostering collaboration between physical therapy and surgery with six clicks may allow for greater predictability of expected recovery time and outcome.

**PRUDHVI GUNDUPALLI, BS; MARCOS D. ARCINIEGA, BS; LUIS F. CASTRO, BS; DR. JOHN A. BUTMAN, MD,
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Selfie-Induced Diagnostic Challenge in Horner Syndrome

Introduction: “Selfie” photographs using front-facing cameras are often presented by patients as digital evidence of symptoms. A possible pitfall for the clinician can occur with certain phones that, by default, can mirror a selfie image such that right-is-left and left-is-right. This can be particularly problematic in neurology as mistaking the laterality of symptoms can cause unnecessary delays in diagnosis and treatment. We present the case of an 18-year-old female with neurofibromatosis type 1 (NF1) who presented with Horner syndrome and Harlequin sign.
Methods: An 18-year-old woman with NF1 and previous resection of brachial plexus neurofibroma presented to the clinic with hemifacial flushing while running outside in the summer heat. She also reported an associated dull, intermittent pain in her right shoulder. The pain was exacerbated when she moved her arm above her head. The patient proceeded to send a “selfie” photograph to her medical team.
Results: The selfie appeared to show flushing on the right hemiface and pallor on the left side, however, the patient reported the opposite. During physical examination, a previous surgical scar helped identify the side of pallor to the right hemiface and magnetic resonance imaging (MRI) confirmed a right-sided thoracic outlet tumor.
Conclusions: Hemifacial, post-exertional pallor (Harlequin sign), along with Horner syndrome, can be symptoms of tumors in the neck or mediastinum. Prior brachial plexus surgery scar served as a landmark to help identify laterality. Compression of the stellate ganglion by the thoracic outlet tumor will cause ipsilateral miosis and pallor. MRIs, brands of cell phones, and media applications can cause left-right confusion for the clinician. Physicians need to be made aware of laterality in photographs taken by patients to ensure proper diagnosis. When physicians have patients take selfies, the physician can request the patient to raise their right hand in the image.

ANDREW IBRAHIM, BS; VIVIE TRAN, BS; ANNMARIE FARAG; MARINA ISKANDIR, MD; MOHAMMAD (MAC) ANSARI, MD

Atherectomy as a Crucial Technique for Achieving Peripheral Vascular Intervention in Complete Vessel Occlusion with Severe Calcification

Introduction
Severe vascular calcification remains a persistent challenge to peripheral vascular intervention (PVI). Historically, balloon angioplasty has been used in the management of calcified lesions, yet this method has shown limited effectiveness in heavy calcification. Orbital atherectomy (OA) is a novel technique that has demonstrated superior debulking of heavily calcified vessels with efficacy and safety. The use of OA has optimized outcomes of PVI in complex, calcified lesions, yet its use has recently been heavily debated. We present a patient in which atherectomy, particularly orbital atherectomy, was the last resort in achieving multivessel PVI in an otherwise high-risk non-surgical candidate.
Case Presentation
Male age 82 with PMH of HTN, DM, CAD, and PAD presented with exertional dyspnea and severe claudication. Angiography revealed multivessel stenosis with chronic total occlusion (CTO) of the superficial femoral artery (SFA) and popliteal artery (PA).
Retrograde right femoral access was used and multiple subsequent techniques were applied to cross the completely occluded lesion. Due to severe calcification, there was extreme difficulty advancing any equipment, and after multiple attempts, the decision was made to proceed with atherectomy. Orbital atherectomy of the SFA and PA was successfully performed using the CSI Diamondback system, achieving the luminal gain needed to deliver initial balloon angioplasty, followed by stent placement, and hence, percutaneous endoluminal bypass was performed due to vessels obliterated by severe calcification, resulting in restored perfusion to the lower extremity.
Discussion
In this high-risk non-surgical candidate, PVI was the last available revascularization option. Due to severe calcification, however, PVI was made possible only through the debulking provided by atherectomy. This case is a glaring example of the necessity of atherectomy, specifically orbital atherectomy, in achieving successful intervention in severe vessel calcification. This technique poses as a valuable tool in deliverability to perform percutaneous endoluminal bypass when no alternative options are available.

JORDAN G. KASSAB, M.S.; R. HAYDEN MEEKS, M.S.; WERNER DE RIESE, MD PHD

The Evolving Role for Androgen Deprivation Therapy in Locally Advanced and Metastatic Prostate Cancer

Introduction:
Prostate cancer (PCa) is the most common malignancy and the second most common cause of death in men globally. In 1966, Dr. C. Huggins as the first urologist earned the Nobel prize in Medicine for his work in the late 1930's on the dramatic therapeutic effects of androgen deprivation in patients with advanced PCa. This discovery established androgen deprivation therapy (ADT) as the treatment of choice for advanced stages of PCa. Later on, surgical castration evolved into reversible pharmacologic castration by administering luteinizing hormone-releasing hormone (LHRH) agonists. Continuous ADT (cADT) has been, and still is standard of treatment. However, intermittent ADT (iADT) has emerged as a therapeutic alternative to cADT. The purpose of this scoping review is to compare cancer-specific and all-cause mortality for cADT and iADT, and to offer some guidance for practicing clinicians in selecting the appropriate form of systemic ADT.
Methods:
We did a systemic database search for prospective randomized clinical trials (RCTs) on cADT and iADT. Inclusion and exclusion criteria were defined. Qualitatively, we assessed the role of iADT as an alternative choice for urologic clinicians, with a focus on the type of androgen agonist or antagonist used, and recent therapeutic advances.
Results:
There was no statistically significant difference in PCa-specific mortality between iADT and cADT. Although statistically not significant, the analysis of non-PCa and all-cause mortality favored iADT over cADT.
Conclusion:
Based on the analysis, these two treatment modalities for locally advanced and metastatic PCa can be considered as equivalent in long-term treatment outcomes. As iADT is more cost-efficient and less likely to yield adverse side effects, practicing urologists and medical oncologists should be aware of these findings when discussing the appropriate form of ADT with their patients. Furthermore, future treatment guidelines should consider these advantages of iADT over cADT.

RILEY MCCREADY, BA; CLAUDIA MORRIS, BSA; J. JOSH LAWRENCE, PHD

Associations between Vitamin D, Diabetes, Cognitive Status, and Hispanic Ethnicity amongst Older Rural West Texans: A Project FRONTIER Study

Introduction: Diabetes is associated with cognitive decline, and Vitamin D (VD) deficiency is implicated as a risk factor for diabetes. However, the specifics of the relationships between these variables remain unclear. Additionally, previous studies suggest that Hispanic populations have a higher risk of VD deficiency, diabetes, and cognitive decline. We aimed to assess associations between VD level, diabetes, cognitive status, and Hispanic ethnicity (HE) amongst a sample of aging, rural West Texans from Project FRONTIER (PF; Facing Rural Obstacles to Health Care Now Through Intervention, Education, and Research). Methods: Data was obtained from a cohort of 292 PF participants (mean age 62.6±11.8, 70.5% female, 40.1% HE). We examined relationships between VD level, blood-based diabetes-related biomarkers, consensus diabetes diagnosis, Repeatable Assessment for Neuropsychological Status (RBANS) total score, and HE status. Logistic and linear regression analyses were performed on binary and continuous variables, respectively. We utilized Spearman correlation for bivariate comparisons and Mann-Whitney U tests for between-group comparisons. Results: Regression analyses indicated significant negative associations between VD and HbA1c ($p=0.0004$), fasting blood glucose ($p=0.0003$), and consensus diabetes diagnosis ($p=0.0060$). Regression analyses indicated significant negative associations between RBANS and HbA1c ($p=0.0282$) and consensus diabetes diagnosis ($p<0.0001$). A significant positive correlation was indicated between VD level and RBANS score ($p=0.0439$). HE was associated with significantly lower VD levels ($p<0.0001$), higher HbA1c ($p=0.0003$), and higher fasting blood glucose levels ($p=0.0011$) compared to non-HE participants. HE was associated with lower RBANS scores ($p<0.0001$), indicating greater levels of cognitive impairment. Conclusions: Our results indicate in a West Texas cohort, HE is associated with lower VD levels, higher levels of diabetic indicators, and greater levels of cognitive impairment. These disparities are important to consider when investigating areas to improve healthcare in West Texas. Further investigation is necessary to elucidate the connection between VD, diabetes, and cognitive decline.

MAAMOON MIAN, JIHANE TAHIRI, FARHOOD SALEHI, EVAN HERNANDEZ, BRENDAN MACKAY MD

Comprehensive Analysis of Snakebite Injuries in the Southwestern United States: A Retrospective Review for Enhanced Patient Management

Introduction: In the United States, approximately 45,000 snake bites occur annually. Of these, 8,000 cases involve venomous snakes. Current management protocols involve scoring the degree of envenomation using a blend of subjective and objective measures in order to decide whether it is appropriate to administer Crotalidae polyvalent immune fab. Although protocols exist for management of snakebite injuries, it is important to continually assess trends in patient demographics, complications, and outcomes as these injuries are not frequently reported in the literature. The goal of this study is continued improvement to current protocols and future management of this patient population. Methods: As a tertiary care center that receives transfers from a large area of Texas and New Mexico, University Medical Center in Lubbock, Texas has treated many snakebite injuries over the years. With institutional IRB approval we retrospectively collected data on 157 patients who presented to the emergency department with a snakebite. Lab values, demographics, average hospital stay, CroFab vials administered, average time from initial injury to admission where collected. Results: Among 157 snakebite cases, 67% involved rattlesnakes. From snakebite to hospitalization the average time was 5.64 hours. Average systolic BP, fibrinogen, platelet count, and d-dimer levels were 130.6, 217.81, 224.18, and 1541.24 respectively. Males accounted for 73% of cases, with an average age of 35. Mean BMI was 29.72, and 83% of subjects were white. The average hospital stay was 3.16 days, during the hospitalization patients received on average 5.79 CroFab vials. Conclusion: Our study highlights common demographics and clinical characteristics of snakebite injuries in the Southwestern United States, aiding in protocol refinement for patient management. The predominance of rattlesnake bites and male victims underscores regional epidemiology. Elevated fibrinogen and d-dimer levels suggest potential coagulopathy, requiring vigilant monitoring and treatment. The relatively young age of victims and prolonged hospital stays emphasize the significant morbidity associated with these injuries. Future research should focus on targeted interventions to mitigate complications and improve outcomes in this patient population.

NAMRATHA MOHAN, MBA; SUYASH JAIN, MBA; SHRUTI PATEL, MBA; DR. ALAN PANG, MD

Efficiency in a Post-Anesthesia Care Unit Following Specialized Checklist Implementation: A Preliminary Report

Introduction: The Joint Commission estimates that 80% of medical errors are due to communication failure during the handoff process.1 During the perioperative period, numerous handoffs occur within a short time period; failure to convey important patient information can compromise safety, yet the current PACU handoff process causes information to be at a significant risk for degradation and miscommunication. Standardized checklists have been implemented in post-anesthesia care units (PACUs) across the country to address deficiencies in communication, patient safety, staff satisfaction, and efficiency.
Methods: In this quality improvement project, we will analyze the efficiency in the UMC PACU following implementation of a specialized standardized checklist. A pre- and post-operative checklist in the UMC PACU will be implemented in order to determine if use of the checklist has made a significant decrease in the number of peri-operative complications to produce better patient outcomes. Patients will be placed in an overall group in order to evaluate how the number of peri-operative complications has changed based on implementation of the checklist before and after with one-tailed T-tests.
Results: Implementation of the checklist will begin in March of 2024, but analyses of current research indicate that use of this standardized checklist will reduce peri-operative complications by 10%, ultimately holistically improving handoff efficiency and most importantly, patient outcomes.
Conclusions: While conclusive results have not been extensively obtained at this current stage, we predict based on preliminary research and analysis that standard checklist implementation in the PACU would allow for an improvement in existing information degradation and miscommunication issues seen in the current handoff process. Standardization of the handoff process is in the best interest of PACU providers to reduce sentinel events in the hospital setting, improve efficiency and consistency in communication, and improve staff satisfaction and patient safety overall.

CLAUDIA MORRIS, BSA; RILEY MCCREADY, BSA; GRACE MCCREA, BSA; BORIS DECOURT, PHD; J. JOSH LAWRENCE, PHD

Examining Relationships Between Hispanic/Latino Ethnicity, Healthcare Access, Vitamin D Deficiency, and General Health Rating among Aging Rural West Texans: A Project FRONTIER Study

Introduction: Previously, we described health disparities in Vitamin D (VD) status, depression, and Hispanic ethnicity in an aging West Texas population from Project FRONTIER (Facing Rural Obstacles to Health Care Now Through Intervention, Education, and Research). Using the same sample, we examined relationships between Hispanic/Latino ethnicity(HLE),variables related to health care access, VD status, and a General Health Rating (GHR).
Methods: Of 299 participants in which serum 25-hydroxyvitamin-D levels were available, we examined relationships between access to care, VD, HLE, and GHR. Logistic and linear regression analyses were performed on binary and categorical variables, respectively. We used Mann Whitney U tests for between group comparisons.
Results: A significant negative association was found between the probability of health insurance and VD level ($p=0.0042$). Lower VD levels were observed in uninsured (24.9 ± 1.4 ng/ml) compared to insured (29.4 ± 0.8 ng/ml) participants ($p=0.004$). We found a significant negative association between VD levels and the probability of experiencing a time in the past 12 months when cost prevented seeing a doctor ($n=294$, $p<0.0001$). We found a significant negative association between VD level and the length of time it had been since the participant had seen a doctor ($p<0.0001$). We found a significant negative correlation between VD level and GHR ($p<0.0001$). Lower VD levels were observed in HLE (21.40 ng/ml) compared to non-HLE (34.00 ng/ml) participants ($p<0.0001$). Finally, we found a significant negative correlation between HLE status and GHR ($p<0.0001$).
Conclusion: Our results reveal that insurance level, access to care, and length of time since seeing a physician likely impact VD status. Additionally, our results reveal that VD status is correlated with HLE. Finally, our results reveal that HLE status and VD status likely impact GHR. The data highlights areas of healthcare in rural West Texas needing improvement.

MEGAN NGUYEN, VIVIE TRAN, SHRUTI PATEL, DANIEL WOOD, ALAN PANG, M.D., JOHN GRISWOLD, M.D.

Nucleated Red Blood Cells in Pediatric Severe Burn Injuries: Prognostic Implications and Clinical Correlations

INTRODUCTION
Pediatric severe burn injuries present challenges in medical care. Notably, nucleated red blood cells (NRBCs) in blood smears, an abnormal finding due to their typical absence during erythrocyte maturation, are intriguing. In critical care, NRBC presence correlates significantly with poor outcomes, yet few studies explore this in severe pediatric burn cases. Recognizing the increased mortality risk in pediatric burn patients, understanding the potential prognostic value of NRBCs becomes crucial for informed clinical decisions and interventions. This study aims to uncover the link between NRBC presence and adverse outcomes in pediatric burn patients, enhancing intervention strategies.
METHODS
76 patient records from UMC Burn Center were analyzed. Data included hospital stay, complications, and mortality. Linear regression explored the NRBC percentage's relationship with hospital and ICU stay lengths. Binary logistic regression assessed the link between NRBC percentage and outcomes (ICU readmission, sepsis, positive culture, intubation, deep vein thrombosis, vasopressor use, pulmonary embolism, pneumonia, mortality).
RESULTS
There was a significant linear relationship between the percentage of NRBCs and both hospital and ICU stay length ($p = 2.62e-12$ and $p = 4.67e-15$, respectively). Furthermore, there was a significant relationship between the percentage of NRBCs and sepsis ($p = 6.32e-4$), positive culture ($p = 1.32e-2$), whether the patient was intubated ($p = 8.64e-4$), and whether the patient developed pneumonia ($p = 1.05e-3$).
CONCLUSION
This study reveals a notable linear relationship between NRBC percentage and prolonged hospital and ICU stays. The study also identifies a correlation between NRBC percentage and critical complications like sepsis, positive culture, intubation, and pneumonia. Recognizing NRBCs could inform clinical decisions and interventions, contributing to enhanced care for this vulnerable patient population. Further research may unveil insights into underlying mechanisms and therapeutic interventions related to NRBC presence in pediatric severe burn injuries.

ALVIN OUSEPH, MS; SCOTT STEPHENS, BS MBA; VISHAL BANDARU, BS, MS, MBA; BRANDON YOUSSI, BS; CHASE RHEINLANDER; ANNA ROSSINI, BS; HABIB ABLA, MS, BS; REN GLOVER, BS; ASHTON WHITE, BS; CHIP SHAW ED.D; ALAN PANG MD; JOHN GRISWOLD MD

Evaluating the Relationships of Body Mass Index and Fluid Resuscitation in Critical Burn Patients

Introduction:
Existing formulas calculating required fluid resuscitation for burn patients primarily consider the size of the burn (total body surface area [TBSA]) and patient size, typically weight (kg). However, as body mass index (BMI) increases, the amount of volume of fluid per kilogram can change. To determine the optimal volume necessary, we evaluated the 24-hour total fluids given, body mass index of a patient, and TBSA of patients.
Methods:
A list of all patients treated at UMC hospital between July 01, 2011 and July 01, 2021 who were diagnosed with Second/Third-degree was obtained. Electronic health records were retrospectively reviewed and data on patient weight, BMI, and total administered fluids were recorded. Patients with incomplete chart data or who did not receive fluid resuscitation were excluded. Multiple regression analysis was conducted on study data to determine relationships between independent variables of patient weight (kg) and burn TBSA on dependent variables of total fluids administered and fluids administered per kg.
Results:
There were 252 patients identified, with 232 meeting inclusion and exclusion criteria. Multiple regression analysis was used to predict Total Fluids administered from both burn TBSA and BMI, with the two predictors explaining 26% of the variance (Adjusted $R2 = 0.2603$, $F(2,229) = 41.65$, $p < 0.01$). Multiple regression analysis predicting Total Fluids administered per kilogram from burn TBSA and BMI indicated that the two predictors explained 26% of the variance (Adjusted $R2 = 0.2676$, $F(2, 229) = 43.21$, $p < 0.01$). The analysis found that BMI was negatively correlated with total fluids administered per kilogram ($\beta = -4.11$, $p<.001$).
Conclusion:
As BMI increases, the amount of fluid necessary increases; however, the results of this study demonstrate a negative correlation between a patients' BMI the amount of fluid per kilogram administered.

DYLAN J PARRY BS; DR. RANDY CLARK MD

The effects of ultrasound-guided percutaneous tenotomy on patients' pain and satisfaction levels

Introduction
Tendinopathy is a common pathology in athletes and adults older than 40 with numerous treatment options available. Percutaneous tenotomy (Tenex) is a newer available procedure to treat chronic tendinopathy which reduces costs and risks compared to other treatments such as surgery and platelet-rich plasma (PRP) injections. The goal of Tenex is to induce an acute inflammatory response which recruits clotting and growth factors, induces bleeding, and transforms scar tissue and diseased tendon into a healing state.
Methods
Tenex was performed in 57 patients for elbow epicondylitis (13), supraspinatus tendonitis (4), gluteal tendinopathy (34), and patellar tendinopathy (5). The survey was created and sent electronically to all 57 patients, yielding 46 respondents. Each patient was surveyed post-operatively to determine their pain levels on a numeric scale from 1-10 prior to and following the procedure. They were additionally asked about their satisfaction with the procedure, if they would recommend the procedure to a friend, and how long they needed to make a complete recovery.
Results
46 of 57 patients responded to the survey. The average healing time was 58 days. No patients required further surgery. There was a significant improvement in pain scores before and after Tenex. 74% of patients were satisfied with the procedure and 80% would recommend it to a friend.
Conclusions
Tenex provides significant relief for tendinopathy in the shoulder, elbow, hip and knee. It prevents further surgery. Some patients did not experience complete relief and benefited from a PRP injection after Tenex. Perhaps some patients did not benefit due to additional pathology, arthritis, tendon tears, and referred pain. More high-quality research is needed to establish the efficacy of Tenex compared to other treatment methods.

DEVKI PATEL; VAISHNAVI PATEL; SHELBY BOOCK; KIMBERLY TOUMAZOS; KOMAL SHARMA; GRACE LARA; VIRGIL KEVIN DEMARIO; ALEXANDRA MCQUILLEN; YOUNG SON, DO

Peri and Postoperative Complications of Minimally Invasive Tubal Ligation versus Salpingectomy for Permanent Contraception

Introduction: Salpingectomy and Tubal Ligation are commonly performed procedures for permanent contraception in women. Salpingectomy has been suggested to reduce the risk of ovarian cancer, but its comparative operative and perioperative risks have not been well established. The objective of this study is to compare peri and postoperative complications of minimally invasive tubal ligation versus salpingectomy for permanent contraception.
Methods: We conducted a retrospective cohort study of women who underwent Salpingectomy or Tubal Ligation for permanent contraception between 2018 and 2021 using data from the American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database. The primary outcomes were intraoperative or postoperative transfusion, operation time, and length of hospital stay. Secondary outcomes were perioperative and postoperative complications.
Results: A retrospective cohort study was conducted using the NSQIP database from 2008 to 2021 using CPT codes for laparoscopic salpingectomy and laparoscopic tubal ligation as the inclusion criteria. A total of 49,445 patients were included. Of the total, 91.6% underwent salpingectomy and 8.4% received tubal ligation. Salpingectomy had a higher risk of operative and postoperative complications compared to tubal ligation. Salpingectomy had a higher risk of intraoperative or postoperative transfusion, longer operation time, longer hospital stay, readmission, and unplanned reoperation. In addition, occurrences of organ space surgical site infection, urinary tract infection, and sepsis were significantly higher in the salpingectomy group compared to the tubal ligation group.
Conclusion: Tubal ligation and salpingectomy are both safe and effective procedures for permanent contraception, however, salpingectomy is more likely to be associated with peri and postoperative complications. These findings may help guide clinical decision-making when selecting the optimal permanent contraception method for women.

ALEJANDRO PONCE-CRUZ, VISHAL V. BANDARU, SOPHIE L. TALBOT, RICARDO I. GARCIA, LUIS J. CARBAJAL, POOJA SETHI

Yearlong Near-Syncope; Unusual Presentation of a Right Atrial Myxoma

Introduction:
Cardiac tumors are rare, reported to be 0.2% of all tumors found in humans. Roughly 75% are benign, and 50% of these are myxomas. Characteristic findings of atrial myxomas include syncope, dizziness, orthopnea, pulmonary edema, cough, palpitations, fatigue, hemoptysis, and chest pain. Right atrial myxomas have been found to be associated with abdominal distension due to ascites. Auscultation can reveal a “tumor plop” heart murmur. Diagnostically, atrial myxomas have generally been found via 2D-Echocardiograms such as a TTE, TEE, or via CT or MRI.
Methods:
The patient was referred to a cardiology clinic in December 2022 where a TTE showed a right atrial mass concerning for myxoma and was then sent to the emergency center for further evaluation. A repeat TTE which revealed a large 4.3 x 4.0 cm spherical mass arising in the right atrium and a small pericardial effusion without tamponade physiology. This mass appeared partially vascularized, raising suspicion for a myxoma. Our patient was placed on cardiopulmonary bypass and underwent sternotomy with successful resection of the right atrial singular circular mass.
Results:
Three different specimens of the excised mass were selected and sent to pathology. The sections showed polygonal/stellate myxoma (lepidic) cells around blood vessels within myxoid stroma, positive for Calretinin stain, consistent with cardiac myxoma. In additional stains, S100 was negative and CD 68 highlighted scattered histiocytes. The immunohistochemistry supported the diagnosis of an atrial myxoma.
Conclusions:
Surgical resection is often the choice of treatment which has historically resolved symptoms. Excisional biopsy and IHC are often necessary to confirm the diagnosis of a myxoma and exclude other possibilities. Our patient's yearlong palpitations and near-syncope symptoms were resolved post-surgery. The duration of the symptomatology warrants a deeper investigation into placing myxomas higher in the diagnostic differential for older patients.

ERNESTO PONCE-CRUZ, VISHAL BANDARU, MARK BAZEMORE, JACKSON DRISKILL, COLBY GORDON, TRAVIS COLE, CHIP SHAW EDD, ALAN PANG MD, JOHN GRISWOLD MD

BURN PATIENTS BUN AND CREATININE LEVELS AS AN INDICATOR OF FUROSEMIDE EFFECTS

Introduction:
Furosemide has been used to decrease fluid retention. While loop diuretics should effectively decrease fluid retention, theoretical activation of the renin-angiotensin-aldosterone system causes more harm than good in the long-term outcomes of patients. This results in similar or worse outcomes in congestive heart failure (CHF) and acute kidney injury (AKI) patients. Patients with different blood urea nitrogen (BUN) and creatinine levels do not respond differently in burn patients.
Methods:
This study is a retrospective review of patients meeting inclusion criteria, ages between 18-89 and usage of furosemide, admitted to the burn center. After obtaining the patient list meeting criteria, we will separate patients based on creatinine and BUN admission levels.
Results:
A patient list (n=258) was obtained based on the inclusion criteria. Furosemide patients with an AKI were correlated with a higher BUN and higher Creatinine based on a welch T-test (p=0.046, 0.0067). Furosemide patients were divided into BUN below and above 15 mg/dl. Patients were evaluated for urine output after furosemide administration for the first four hours; there was a significant difference in the urine output between the first and second hour after furosemide administration based on both total urine output per hour and total output volume per hour per kilogram (urine output standardized) (p=0.0086, p=0.019) where patients with a low BUN had a higher urine output.
Conclusion:
Patients that were administered furosemide and had a higher BUN or a higher Creatinine were associated with higher rates of AKI. The difference between the first to second hour in urine output and urine output standardized for BUN indicates a decreased efficacy of furosemide for patients with higher BUN. The differences between the hours were not significant between high and low creatinine.

LIZABELLE RUSSELL, BRANDON YOUSSI, VISHAL BANDARU, ASHTON WHITE, LAUREN GLOVER, ANNA ROSSINI, HABIB ABLA, CHIP SHAW ALAN PANG MD, (PI) JOHN GRISWOLD MD

MORTALITY AFTER FLUID-RESUSCITATION, AN ARTIFICIAL NEURAL NETWORK

Introduction
Fluid resuscitation is a critical aspect of burn patient care, but over or under resuscitation can lead to serious complications and even mortality. To address this issue, we developed an artificial neural network (ANN) to predict mortality based on factors such as %TBSA and fluid amount.
Methods
We obtained electronic health records (EHR) for burn patients with a TBSA greater than 15%, received fluid resuscitation, and ages between 18-89 from July 01, 2011 - July 01, 2021, and manually collected chart data. The dataset included gender, age on admission, BMI, total second-degree burn, total third-degree burn, total burn, inhalation injury, urine output, and crystalloids, colloids, blood, and pressors administered.
The neural network was implemented using MATLAB version R2022b, and the performance metrics were calculated using the built-in functions provided by the Neural Network Toolbox. The data was randomly split into a 70/15/15 training, validation, and testing set. The search was limited to a range of hidden layer sizes from 1 to 25 and neurons per layer. The best configuration was determined based on the average ROC AUC over 3 runs. A hidden layer with 4 layers and 9 neurons were identified as the best fit for our model.
Results
The ANN achieved an average recall of 93%, and accuracy of 91% as well as an average ROC AUC of 0.93 after 30 runs on 250 burn patients. The network's ability to distinguish between positive and negative samples was high, indicating that the model accurately predicted mortality in burn patients.
Conclusion
Overall, our findings suggest that the ANN architecture we used is effective for predicting mortality in burn patients having undergone fluid resuscitation. More patient data and further implementation of machine learning to increase the accuracy of mortality prediction and predicting fluid resuscitation may be the next step.

FARHOOD SALEHI, BS; MAAMOON MIAN, BS; DR. COOPER PHILLIPS, MD FCCM NCCM

Regional Anesthesia vs. General Anesthesia in Total Hip Arthroplasty

Introduction: Total Hip Arthroplasty replaces a damaged hip joint to alleviate pain. Anesthesia, crucial for safety, is chosen in preoperative consultations. General anesthesia induces unconsciousness; regional anesthesia numbs the lower body in THA. Ongoing research on anesthesia modalities in THA remains inconclusive, warranting further study for efficacy and reliability.
Methods: This study explores postoperative outcomes associated with general and spinal anesthesia through a literature review, integrating findings from three RCTs and one clinical trial. RCTs include evaluations of patients over 65, recovery profiles of 120 patients assessing hospital stay, nausea, and pain levels. Additionally, a comparison of general, spinal, and caudal anesthesia in 198 patients analyzes analgesic requirements, Beta amyloid expression, and postoperative pain and cognitive functions. The clinical trial examines pulmonary embolism incidence, transfusion requirements, and blood flow in 30 patients undergoing caudal or general anesthesia.
Results: Trial outcomes align with the meta-analysis, revealing minimal differences between regional and general anesthesia in postoperative complications. The need for more extensive research is emphasized. The first RCT, with 941 participants, showed comparable postoperative delirium rates, worst pain, hospitalization, mortality rates, episodes of nausea, vomiting, and hypotension. The second RCT demonstrated a slightly reduced hospital stay with general anesthesia, and lower pain levels after 6 hours. The third RCT indicated fewer perioperative adverse effects with regional anesthesia compared to general. In the clinical trial, continuous epidural block exhibited a lower frequency of DVT (20%) compared to general anesthesia (73%). Conclusion: This literature review emphasizes the need for ongoing research about anesthesia choice in THA. The evidence reveals subtle distinctions between various techniques. It is crucial to sustain research efforts to refine our understanding of the most suitable anesthesia for specific demographics with underlying conditions. Such insights will enable surgeons and anesthesiologists to make better decisions in selecting the appropriate technique for THA.

JULIE SANG, MPH; DUKE APPIAH, PHD MPH

The Association of Infertility Treatments and Severe Congenital Heart Defects in the United States

INTRODUCTION: The use of infertility treatment in the United States has been increasing over the past few decades. While such treatments, including assisted reproductive technology (ART) and non-ART treatments, have improved the quality of life for those who cannot naturally conceive, concerns have been raised about its safety for offspring. This study aimed to investigate the association between infertility treatments and cyanotic congenital heart defects (CCHD), and to evaluate factors that mediate this association.
METHODS: This population-based retrospective cohort study used data from the National Vital Statistics System, which included 9.2 million singleton live births among first-time mothers aged 15-49 years from 2016 to 2022. Logistic regression models were employed to estimate odds ratios (OR) and 95% confidence intervals (CI).
RESULTS: During the study period, the proportion of births resulting from infertility treatments increased from 1.9% to 3.0%. After controlling for maternal and paternal factors, both ART (OR 2.08, 95% CI: 1.77-2.45) and non-ART treatment (OR 1.87, 95% CI: 1.49-2.33) were associated with an increased risk of CCHD compared to naturally conceived births. Pregnancy complications, participation in supplemental nutrition programs, and adequacy of prenatal care together accounted for only 5.1% of the association, with 94.9% of the odds of CCHD attributable to infertility treatment.
CONCLUSIONS: In this study, both ART and non-ART infertility treatments were associated with elevated odds of CCHD. Given the rising use of infertility treatments in the US, this finding has significant implications for the clinical and public health of reproductive-aged individuals. Further research is needed to evaluate the impact of specific infertility treatments on the risk of major congenital cardiac defects.

BENNETT SCHACKMUTH, B.S.; JAMES C. WANG, MD, PHD

CREST Syndrome-Related Recurrent Posterior Auricular Dystrophic Calcinosis Cutis Post Otoplasty

Background
Dystrophic calcinosis cutis (CC) is a medical condition characterized by abnormal deposition of calcium salts in the skin and subcutaneous tissues that is typically associated with systemic autoimmune disease that induces tissue damage creating focal points for calcification. Of the 5 classifications of CC, dystrophic CC is the most common form of CC.
Learning Objectives
Participants will learn about the first reported case of recurrent dystrophic CC post otoplasty.
Study Objectives
Describe the presentation of a recurrent dystrophic CC masses post otoplasty, possible reasons for recurrence, and treatment methodologies.
Method/Design Type
Case Report and Review of Literature.
Results
A 53-year-old male with a history of CREST syndrome initially presented to the clinic with recurrent posterior ear masses years post otoplasty. They had previously been excised multiple times prior to presentation to our clinic. After resection of the right posterior ear mass, the patient returned 10 months later for excision of a left posterior ear mass. Dermatopathology revealed these masses were consistent with dystrophic calcinosis cutis. Since excision of the right and left ear masses, they have not recurred over 15 and 5 months, respectively.
Conclusions
Dystrophic CC is an uncommon medical condition which typically occurs due to tissue damage from autoimmune diseases. There are multiple treatment modalities that are available for this condition ranging from medication to surgical excision and are dependent on location and severity of the masses. If surgical excision is chosen as a treatment, care must be taken to excise the entire lesion to prevent recurrence.

HANNAH SEO B.G.S.; ELISE BOLIN B.S.; CAROLINE PRESSON B.S.; JOEY HOLZER B.S., M.A.; SUYASH JAIN B.S.; SHRUTI PATEL B.S.; DR. KELLY MITCHELL M.D.

Adherence to Recommended Eye Examination Intervals Based on Reported Concerns in Visual Health in Elderly Patients

Current guidelines recommend biannual eye examinations for elderly patients to screen for preventable vision issues; however, adherence to these recommendations remains low. While visual acuity and overall eye health decline naturally with age, the absence of regular screening increases rates of preventable causes of blindness including cataracts and glaucoma. This study evaluates how eye exam frequency correlates with vision-related quality of life in 50 adults aged 55 or above surveyed via phone assisted by Project FRONTIER using the Visual Functioning Questionnaire-25 (VFQ-25). Additional survey questions gather data on demographics, knowledge of guidelines, and ocular conditions. Participants are stratified into four cohorts based on VFQ-25 score and exam frequency. The subgroups with low scores and below-average attendance, along with high scorers with below-average attendance, will inform tailored plans. The evaluation of the relationship between vision-related quality of life and eye exam frequency aids in identifying barriers among rural elderly and informing interventions for increasing eye exam frequency. This research aims to enhance comprehension of cognitive aging in rural communities, offering insights for future interventions to improve health accessibility to rural populations. Future research will analyze rural patients' eye exam outcomes alongside general health exams.

QURATULAIN SHEKOH; SOPHIE TALBOT; VISHAL BANDARU; TUNG NGUYEN; DAUOD ARIF; POOJA SETHI

Rapid Development of Primary Right Atrial Angiosarcoma

Introduction: Cardiac angiosarcomas are small segments of all soft tissue sarcomas, with high levels of metastasis, and poor median survival outcomes. One-year survival rates have been reported to be 39% while 5-year survival rates have been reported at 35%.
Methods: A 58-year-old male admitted in May for pericardial effusion showed negative cytology for malignancies. In November he presented in ER with one week of dyspnea on moderate exertion with chest pain that alleviated with rest. Initial CT angiography chest suggested right atrial mass measuring approximately 4cm with moderate right pleural effusion. The lab workup indicated troponin being negative and flat at 13, and pro-brain natriuretic peptide within normal limit. A right thoracentesis was performed, pleural fluid analysis noted pleural fluid protein of 4.3 to serum 6.2 with pleural fluid lactate dehydrogenase at 1200, indicative of exudative pleural fluid. CT chest/abdomen/pelvis showed a right atrial mass incompletely evaluated on the current exam, moderate right pleural effusion. A TEE with Doppler/Color/Contrast showed an atrial mass noted in the right atrium closer to the superior vena cava. MRI confirmed a single 5 x 3.5 x 4.8 cm mass involving the free wall of the right atrium with no extension to the tricuspid valve indicative of sarcoma. The patient underwent sternotomy with mass resection. Most of the atrial free wall was resected and reconstructed with a pericardial patch. Mass sent to pathology came positive for malignant neoplasm with vascular differentiation, consistent with angiosarcoma. Patient was referred to oncology for further treatment and staging.
Conclusion: Atrial angiosarcomas have an incredibly high mortality rate due to late diagnosis, rapid onset, and metastasis. In this case, the initial echocardiogram in May showed no indication of angiosarcoma however it was diagnosed on TTE six months after the patient’s pericardial tamponade, showing this rapid progression.

ALEXANDER SMITH, BS; CAROLINE CUSHMAN, BS; ANDREW IBRAHIM, BS; MIMI ZUMWALT, MD

Systemic and Local Peptide Therapies for Soft Tissue Regeneration: A Narrative Review

Introduction
The musculoskeletal system is one of the largest contributors to joint pain, owing to rheumatoid arthritis, osteoarthritis, and musculoskeletal injury. Administration of peptides for treatment of joint pain or inflammation is an emerging line of therapy that seeks to offer therapeutic benefits while remaining safe and non-invasive. Selection of the most appropriate peptide for treatment is multifactorial, specifically considering routes of administration (RoA). The purpose of this study is to review the current literature on existing oral peptide agents, intra-articular peptide agents, and new developments in human trials to assess different RoAs in soft tissue regeneration.
Methods
The authors conducted a narrative literature review examining studies on various treatment mechanisms of action, etiology of joint-related symptoms, and the multi-component nature of peptide therapy in the context of wound healing, tissue remodeling, and angiogenesis-promotion.
Results
This narrative review finds emerging peptide treatments that have been shown to be safe, inexpensive, and well-studied. Incorporation of compounds such as human peptide GHK into creams or delivery through microneedles has shown a wide range of health-promoting qualities. Conversely, peptides like BPC-157 have shown proliferation of fibroblasts and positive outcomes in mice studies, yet their mechanisms are not well elucidated in humans due to lack of literature. Collagen type II is known for its role in promotion of soft tissue regeneration. Naturally formed, it reduces inflammation and improves joint function through the restoration of collagen. This review considers the efficacy and availability of peptide treatments, such as the aforementioned.
Conclusion
Peptide treatments have an array of effects in repair and regeneration of soft tissue on local and systemic levels. In their infancy, further inquiries into emerging peptides will be necessary for widespread approval and use. As a viable alternative to surgical intervention, peptide treatments present as promising candidates in positive soft tissue regeneration outcomes.

KRITIN K. VERMA, MBA; ARPITA GAGGAR, BS; KRISTINA BLEGEN, DO; ETHAN MATTHEW, MD; & MICHELLE B. TARBOX, MD

Innovations in Pediatric Atopic Dermatitis from Diagnosis to Cutting-Edge Therapies

This presentation presents an overview of pediatric atopic dermatitis, a persistent and distressing illness that affects a considerable number of children worldwide. The background part examines the prevalence, clinical characteristics, and pathogenesis of atopic dermatitis, with an emphasis on the difficulties in diagnosis due to a lack of reliable diagnostics. The evaluation of the literature includes the most recent diagnostic criteria, current treatment modalities, and emerging therapeutics for pediatric atopic dermatitis. It emphasizes the Hanifin and Rajka criteria for diagnosis, the use of topical corticosteroids, calcineurin inhibitors, and off-label choices like methotrexate for therapy, as well as promising new medicines including JAK-STAT inhibitors, IL-4/IL-13 antagonists, and IL-31R antagonists. The conclusion underlines the importance of a multifaceted approach to atopic dermatitis treatment in children. This review is based on the most recent research presented at the Global Multidisciplinary Conference on Treatment Options for Atopic Dermatitis, as well as recent pediatric dermatology articles.

JOEL P. WHITE, BRANDON YOUSSI, VISHAL BANDARU, RYAN D MORGAN, KEVIN M NGUYEN, XIYU LIU, TRISTIN CHAUDHURY, TRAVIS COLE, CHIP SHAW EDD, ALAN PANG MD, JOHN GRISWOLD MD

LENGTH OF STAY PREDICTION BASED ON A FEED FORWARD ARTIFICIAL NEURAL NETWORK

Introduction
Hospital length of stay (LOS) is difficult to predict in patients with burn injuries due to the complexity of the injuries and the wide variability in patient outcomes. Predicting hospital LOS in patients with burn injuries can have numerous benefits for patients, physicians, and insurance companies. Feedforward neural networks may offer insight into more accurate LOS predictions.
Methods
We obtained electronic health records (EHR) for burn patients from July 01, 2011 - July 01, 2021. A feedforward neural network was used to model the relationship between the input features and LOS. The input features were preprocessed by normalizing each feature to the range [0, 1] and transforming the output variable (LOS) with a logarithmic function to improve the distribution. The preprocessed data was split into training (70%), validation (15%), and testing (15%) sets. The neural network consisted of one hidden layer with 13 neurons and a linear output layer.
Results
The neural network achieved an R-squared (R2) value of 0.72 on the training data, indicating that 72% of the variance in the data (n=1347) was explained by the neural network. The validation and testing R2 values were 0.66 and 0.68, respectively. The overall R2 value, computed by combining the predictions on the training, validation, and testing data, was 0.70. The best performance, validation performance, and testing performance achieved by the neural network during the training process were 0.28, 0.27, and 0.30, respectively; lower values indicating better performance.
Conclusion
The results suggest that the neural network can model the relationship between the input features and LOS with reasonable accuracy. The R2 values indicate that the model explains a substantial amount of the variability in the data. Further testing and validation may be needed to assess the robustness and reliability of the model.

DANIEL XUE; ANDREW IBRAHIM; SHIVAM BHAKTA; DR. COOPER PHILLIPS, MD

A Unique Presentation of New Onset Refractory Status Epilepticus by Benzodiazepine Overdose and Withdrawal Complicated by Methamphetamine Abuse

Introduction: Status Epilepticus (SE) is continuous seizure activity without recovery to baseline, lasting over 5 minutes. Refractory Status Epilepticus (RSE) is failure to resolve SE after first-line treatment of benzodiazepines and second-line treatments of IV anti-epileptic medication. Super Refractory Status Epilepticus (SRSE) is an RSE that does not resolve within 24 hours. New Onset Refractory Status Epilepticus (NORSE) is an SRSE that develops without any history of neurological disorders and epilepsy and is the focus of this report. Literature shows that NORSE can classically arise in patients with anti-NMDA receptor-associated encephalitis in paraneoplastic autoimmune encephalitis caused by HSV-1 infections, predominantly in young females. While there have been several reports in the literature on this classic presentation of NORSE, none have identified previous benzodiazepine and methamphetamine abuse as the likely triggers for this condition, which we present in this report.
Case Presentation: A 28-year-old female with altered mental status, pyogenic infection, and encephalitis, indicated by her symptoms, lumbar puncture, and EEG was admitted to the emergency room. The patient was started on CIWA protocol due to suspicion of benzodiazepine withdrawal complicated by methamphetamine abuse. She developed new-onset status epilepticus consistent with NORSE, refractory to aggressive epileptic treatment including multiple antiepileptics, corticosteroids, IVIG, and anesthetic agents during the entire length of her hospital stay. After 44 days of variable, aggressive treatment, there were no signs of improvement. Sedation and induced coma were discontinued until the patient's death on hospital day 47.
Discussion: This case is a glaring example of the complexity of NORSE management, especially in patients with a history of benzodiazepine and amphetamine abuse. This report underscores the necessity for the elucidation of how benzodiazepine/amphetamine-induced encephalitis is implicated in anti-NMDA receptor encephalitis, and for the development of effective treatments for NORSE in patients who have a history of abuse.

School of Medicine, year 2

JENNIFER ADJEI-MOSI, WALI YOUSUFZAI, PEGGY EDWARDS, DAN STUART, REGINA BARONIA, WAIL AMOR

Incidence of PTSD and comorbidities in Long Covid

Introduction: Post-Traumatic stress disorder (PTSD) has emerged as a significant concern among individuals who experienced Long Covid. This study examines the articles that report on the incidence of new PTSD cases in patients with Long Covid symptoms based on PTSD screening tools and explores associated comorbidities.
Methods: A scoping review in Covidence screened 7526 articles published from January 1, 2020, to September 30, 2023 on Long Covid presentation. Relevant search terms were used in 6 databases (PubMed, LitCovid, EMBASE, Cochrane CRCT & DSR, PsycInfo, ClinicalTrials.gov). Inclusion criteria are articles reporting on positive screening for PTSD in confirmed Covid cases. Articles included were observational studies, including cohort studies, case-control studies, case series, cross sectional studies, and literature reviews that reported on cases of PTSD presenting after prolonged COVID symptoms. Excluded were non-human studies, studies predating 2020, non-peer reviewed and opinion articles.
Results: From the screened articles, 28 studies reported new cases of PTSD symptoms in Long Covid patients, reporting a wide range between 1.15% to 67.5%. Noteworthy comorbidities reported in 3 articles were hypertension (27.2% - 60%). 3 articles also discussed diabetes as a comorbidity with an incidence ranging from 14% - 30%. Furthermore, one article also mentioned cardiovascular disease in 6.4% of these patients. Additionally, an article found a significant association between PTSD in Long Covid and depression with an incidence of 41.5%
Conclusion: This study highlights the varied neuropsychiatric presentation of Long Covid and underscores the need to assess symptoms of PTSD in patients presenting with Long Covid. Understanding a complex interplay of psychological and physical comorbidities is crucial for developing comprehensive strategies to address the long-term effects of Covid-19 on mental health.

JACK ALLEN, JUSTIN HARDER, EVAN HERNANDEZ, STEPHANIE STROEVER PHD, BRYAN BOURLAND DO, BRENDAN MACKAY MD

The Effect of BMI on Open Carpal Tunnel Release Recovery

Introduction:
The purpose of this study is to determine if a relationship exists between BMI, specifically obesity, and surgical outcomes for open carpal tunnel release. Obesity is correlated with increased incidence of carpal tunnel syndrome; however, the effect of obesity on post release recovery has not been examined.
Methods:
This study utilized a retrospective review of patient charts (n=142). BMI was calculated based on height and weight measurements and patients were grouped into healthy BMI 18.5-24.9, overweight 25-29.9, obesity class one 30-34.9 (OB1), obesity class 2 35-39.9 (OB2), or obesity class three 40+ (OB3). Data was then complied on surgical outcomes via preoperative pain, post-operative pain at 2 weeks and 6 weeks, post-operative joint stiffness, wound healing time, and infection status. Data was analyzed via chi square analyses and via multivariable logistic regression to assess differences in treatment outcome while controlling for possible confounding variables.
Results:
Age at time of release was found to be inversely correlated with BMI. Healthy BMI patients (n=19) underwent release at an average age of 59.1 years old while OB 3 (n=30) underwent release at an average age of 46.93 years old. The odds of improvement in pain were significantly lower in all three OB groups when compared to healthy BMI at both 2 weeks and 6 weeks post operation.
Conclusions:
Our results indicate that obesity may be positively correlated with earlier incidence of carpal tunnel syndrome requiring surgical intervention. The data also indicates increased rates of post-operative complications in obese patients, particularly patients with class 3 obesity. Patients with class 3 obesity need to understand these risks prior to undergoing open release. Further study should examine the impact of type 2 diabetes on carpal tunnel release recovery.

ASHLYN ANDERSON BS, VARSHINI SURESH MBA, CARINA WATSON BS, DELANEY SAUERS BS, ABDUL AWAL BSC MSC MS, ALAN PANG MD, (PI) MARK REEDY MD

Platelet Count as an Indicator of Ovarian Malignancy in Women with Ascites

Introduction: Ascites, characterized by pathological fluid accumulation in the peritoneal cavity, is primarily associated with liver cirrhosis, but 10% of cases are attributed to cancer etiology. Thrombocytopenia, common in cirrhotic patients, contrasts with thrombocytosis observed in gynecologic cancers. This study explores the utility of platelet counts in distinguishing between malignant and cirrhotic ascites, aiming to expedite accurate diagnoses.
Methods: A retrospective chart review was conducted from January 2019 to May 2023 using Electronic Health Records (EHR) from UMC Health System. Selection criteria were based on Current Procedural Terminology (CPT) and ICD-10 codes. Inclusion criteria involved age (18-89), ascites diagnosis, and recorded platelet, albumin, and prothrombin time levels. Data analysis employed STATA 17.0, including logistic regression and ROC curve analysis.
Results: Analysis of 109 patient charts revealed a significant association between platelet counts >350,000/μL and malignant ascites (47.3% vs. 12.9%, $p = 0.000$). Median prothrombin time was higher in non-malignant cases (15.4 vs. 14.2, $p = 0.011$). Platelet counts >250,000 exhibited optimal discriminatory power for malignant ascites, with notable sensitivity, specificity, and predictive values.
Conclusions: This retrospective exploratory analysis suggests that elevated platelet counts, especially above 250,000/μL, may serve as a valuable screening tool for distinguishing between malignant and cirrhotic ascites in women. Implementing a platelet count cut-off could aid in expediting accurate diagnoses, reducing the need for invasive and costly tests.

SHREYA BALAMURALI, WALI YOUSUFZAI, PEGGY EDWARDS, DAN STUART, REGINA BARONIA, WAIL AMOR

Female Sex, Hospitalization Status and Age as risk factors predisposing patients to PTSD symptoms post COVID

Introduction: Post-traumatic stress disorder (PTSD) is increasingly observed in Long Covid. This review assesses the various risk factors predisposing patients to developing PTSD symptoms post- SARS CoV-2 infection, namely gender, age and hospitalization status.
Methods: A scoping review of positive PTSD cases in Long Covid was conducted in 6 databases (PubMed, LitCovid, EMBASE, Cochrane CRCT & DSR, PsycInfo, and ClinicalTrials.gov) using relevant search terms for articles published from January 1, 2020 to September 30, 2023. Inclusion criteria includes observational and review articles reporting on new cases based on PTSD screening in patients with confirmed previous Covid infection. Articles on Covid before 2020, non-human studies, and non-peer reviewed or opinion articles were excluded.
Results: Across 28 studies, 9 studies found an association between female gender and higher scores on questionnaires assessing PTSD in patients recovering from SARS CoV-2 infection. 3 articles substantiated the evidence for older age predisposing patients to more severe PTSD symptoms. Furthermore, 3 articles assessing hospitalization and PTSD showed an association between ICU stay, severity of Covid outcomes and development of trauma symptoms. One of the three articles reported that 25% of patients in the ICU develop PTSD.
Conclusion: The various risk factors predisposing patients to the development of anxiety, stress and trauma symptoms associated with post-Covid infection need to be explored further. Specifically, female and older patients need to be assessed for the development of PTSD post-discharge from hospitalization due to Covid. ICU patients with severe symptoms also need to be closely monitored for the development of PTSD and related psychiatric diagnosis.

JOSEPH BAYOUTH, BS; DENNIS EASTMAN, MD, FACS; JUSTIN VAUGHAN, MD, MS; ARIEL SANTOS, MD, MPH, FRCSC, FACS, FCCM

Aorto-enteric Fistula Secondary to Multiple Abdominal Aortic Surgeries

Introduction: An aorto-enteric fistula is defined as an abnormal communication between the aorta and an enteric structure. Aorto-enteric fistulas are a rare, yet highly lethal complication of Abdominal Aortic Aneurysm repair, and provide many diagnostic and treatment challenges. There is no gold standard treatment modality for aorto-enteric fistulas, thus, treatment options must be weighed carefully to ensure the best patient outcomes.
Methods: Presented here is a case of a 70-year-old female afflicted with an aorto-enteric fistula secondary to multiple abdominal aortic surgeries. Her fistula was repaired using an interposition aortic graft and a two-layer duodenorrhaphy.
Results: This patient was transferred to our facility with an unidentified cause of upper and lower gastrointestinal bleeding. After an extensive workup she was diagnosed with an aorto-enteric fistula and in situ reconstruction methods were employed to repair the defect. The patient made a successful recovery after a 55-day hospital stay.
Conclusion: This case illustrates the importance of a thorough workup for vague gastrointestinal bleeding. Additionally, this case highlights many of the diagnostic and treatment challenges associated with aorto-enteric fistulas. Finally, it adds to the body of literature seeking an optimal treatment modality for a highly fatal disease.

OR BELKIN; ELLIOTTE CANNON

Investigating Medication Adherence in a Student-Run Free Clinic with an On-Campus Pharmacy

Intro: Student run free clinics (SFRC) nationwide provide healthcare resources for many individuals in need. The majority of the free clinic patient population includes uninsured individuals of low socioeconomic status who may have language and/or medical illiteracy barriers. In addition, this population is less likely to possess medical insurance or receive routine healthcare. The additive effect of these obstacles creates disparities amongst the access and efficacy of healthcare which makes the availability of SRFCs even more crucial. Concurrently, most SRFCs don't provide direct access to pharmaceuticals through an on-campus pharmacy; yet another deterrent that impedes access to adequate care. We found a published study regarding a SRFC with an off-campus pharmacy that assessed their time-to-pick up rates, so we wanted to compare it to our SRFC with an inhouse pharmacy as we believe it could yield better results and possibly influence other SRFC to do the same. Our study focuses on the potential outcomes that an on-campus pharmacy will have on medical adherence within a SRFC population.
Methods: Data will be collected from each patient who picked up their prescribed medication at our on-campus pharmacy. Medication compliance will be assessed through the days between prescription to medication pickup.
Results: As expected, the patient medication pickup rate was greater in a SRFC with an on-campus pharmacy than as compared to a SRFC with an off-campus pharmacy (awaiting statistical analysis for significance).
Conclusion: With the positive results we have analyzed thus far, we believe this could be a very beneficial addition to SRFCs around the country. Having an on-campus pharmacy improves medication adherence for the free clinic population and could, in result, improve many other barriers such as cost, convenience, and consistency of healthcare that patient's face daily.

SAI PRANATHI BINGI, MBA; STEPHANIE STROEVER, PHD, MPH

Doing something right: longitudinal analysis of United States' Clostridioides difficile standardized infection rates, 2015-2022

Introduction:
Clostridioides difficile (C. difficile) is a healthcare-associated infection (HAI) that is preventable through effective antimicrobial stewardship, environmental cleaning, and transmission-based precautions. In 2015, the federal government implemented the Centers for Medicare and Medicaid Services Inpatient Quality Reporting Program that requires HAI reporting as a measure of healthcare accountability. We hypothesized that greater scrutiny of HAIs at the federal level would result in reductions in statewide standardized infection ratios (SIR) C. difficile. The objective of this study was to determine if there was a statistically significant reduction in SIRs in the United States from 2015-2022.
Methods:
We collected the C. difficile SIRs for each of the 50 states and Washington D.C. from 2015 to 2022. State-level SIRs are published as publicly available data through NHSN. We included data from acute care hospitals only and fit a mixed effect linear regression model with maximum likelihood estimation to test our hypotheses. The model included year as a fixed effect indicator variable and state as a random effect covariate. An $\alpha = 0.05$ was used as threshold for statistical significance for all null hypothesis testing.
Results:
We included data from 51 states for a resulting 408 observations. The statewide SIR for healthcare-associated C. difficile was statistically significantly lower in 2016 ($p = 0.001$) compared to 2015. Each subsequent year demonstrated an increasingly larger reduction in statewide SIR when compared to 2015 (Figure 1).
Conclusion:
Healthcare-associated rates of C. difficile are trending in the desired direction with a significant reduction in statewide SIRs over the last 8 years. It is likely that federally mandated reporting has contributed to the reduction, though further efforts are needed to tease out the specific contributing factors to this effect (e.g., true reduction in rates, different testing methods, greater scrutiny on eligible samples, etc.).

KELSEY BROCK; CAMILLE GAVIN; JAYLYN ROBINSON; RACHEL DEGROOT; MARK REEDY, MD

HPV Vaccination and Education Among College-Aged Females

Introduction
HPV is the most common sexually transmitted infection, affecting up to 80% of women over the course of their lifetimes and increasing the likelihood of developing multiple cancers of the oropharynx and genitourinary system. HPV vaccination reduces the rates of infection, thus lowering the overall risk of these cancers. The CDC recommends that individuals receive the HPV vaccine between the ages of 9-26. We surveyed students in this age group to discern vaccination rates and level of knowledge surrounding HPV and the HPV vaccine.
Methods
Data was collected via online survey instrument on January 29, 2024, with both a pre- and post-survey surrounding a short educational segment in the middle. Respondents were female members of a sorority between the ages of 19-23. We received a total of 105 responses.
Results
Of the 105 individuals surveyed, 49.5% had received the HPV vaccine, 18.1% had not received the vaccine, and 32.4% were unsure of their vaccine status. The average self-reported understanding increased 31.8% post-education. Out of those who did not report being vaccinated (41.0%), 9.5% want the vaccine, 16.2% want to get vaccinated after receiving more information, 9.5% do not want the vaccine, and the remaining 6.0% stated other reasons for not wanting vaccination. Prior to education, 38.1% reported knowing where HPV vaccines were available in Lubbock. After education, 90.5% reported this knowledge, a 137.5% increase.
Conclusions
The significant number of individuals who have not received the HPV vaccine or are unsure of their vaccination status indicates that vaccination rates are still lagging among college-aged female populations. Continued education regarding the prevalence, risk and prevention of HPV is needed to a greater extent in this population. Our study showed that even short educational segments can improve understanding and promote primary intervention via vaccination. Limitations of the study include lack of true population representation through sample self-selection.

LUKE BROCKBANK; MARIBEL CASTRO; SHELBY CORBITT; EMERALD COURTNEY, PA-C; DR. MARK REEDY, MD

Dedifferentiation of Primary Colorectal Adenocarcinoma into Choriocarcinoma: A Case Report

Introduction: Choriocarcinoma is an aggressive malignancy classified as gestational or non-gestational. Non-gestational extragonadal choriocarcinoma (NEC) is an extremely rare malignancy with some forms arising from a primary adenocarcinoma that dedifferentiates into choriocarcinoma. There are only 28 reported cases in the literature of primary NEC arising from colorectal cancer in which all patients have died despite various standard chemotherapeutic and biologic therapies.
Case Description: The patient is a 48-year-old female admitted to gynecology oncology service with an 8-10 cm pelvic mass. She presented with a 3-month history of lower pelvic and back pain, 30-pound weight loss, and abdominal distention. Additionally, she had rapidly rising β-hCG, from 48 to 20,354 mIU/mL over 2 weeks. An urgent laparotomy identified a fixed solid mass involving the cervix, uterus, and upper rectum. Pathology reported a biphasic tumor containing primary rectal adenocarcinoma with dedifferentiation to choriocarcinoma. Serum β-hCG initially fell until two weeks post-op when it rose. CT scan identified liver metastases demonstrating choriocarcinoma. Germ cell regimen was started consisting of etoposide and cisplatin. After four cycles, liver metastases resolved and β-hCG was within normal limits. However, two months after chemotherapy, β-hCG levels began to rise. Olapranib, a PARP inhibitor was started while awaiting molecular profiling. This PARP inhibitor stabilized the hCG levels after one week and decreased her levels after two weeks. Profiling of the tumor identified PD-L1 expression > 50%. Pembrolizamab 200 mg IV and paclitaxel 150 mg/mg was started every 3 weeks in addition to daily Olaparib. Despite a response after 3 cycles of therapy, β-hCG levels began to rise.
Conclusion: NEC is a rare and aggressive disease with a poor prognosis with standard therapies. This patient had an initial response to the novel combination of PARP inhibitor, anti-PDL-1, and paclitaxel.

ELLIOTTE CANNON; HANNAH DOUGLAS; LINDSAY L. PENROSE, PH.D; SAM PRIEN, PH.D

First report of the use of a simple sperm selection system using cryopreserved semen

Introduction: In vitro fertilization, now widely used as the mainstay of infertility treatments, is relied on for nearly 3% of births around the world. This was made possible via significant advances in the specialization of equipment, adaptations with hormonal therapies, and improved culture techniques, however, there is a still a noteworthy gap of knowledge regarding male fertility. Up to now, numerous authors have documented issues regarding sperm preparation techniques, including DNA damage and membrane or organelle disruption, which hamper the widely sought after fertilization rates. This study narrates a new technique for preparing cryopreserved semen samples that enhances sperm motility and viability to create a wider spectrum of fertility treatment options.
Methods: In this study, we utilized a sperm isolation device, known commercially as the NovaSort, but in a reverse fashion. This means rather than allowing the cup to funnel the sample into a central well, we instead put a defrosted frozen sample in the central well and allowed the sperm to migrate inside the specimen cup. Multiple data collection points such as motility and concentration were obtained over time for review.
Results: As expected, there was a trend toward increased motile cell concentration ($P = 0.08$) as time progressed as measured in 15-minute intervals with the cells having better progressive motility ($P < 0.02$) and several improvements in the other parameters ($P < 0.03$).
Conclusions: The improved motility and viability of sperm via this new collection method designed for frozen semen samples sets a new precedent for future models. This system allows for an entire native, frozen sample of ejaculate to be utilized, thus increasing the total number of cells available allowing an efficient, cost-effective option that minimizes destruction of cells and the possibility of human error significantly.

IRINA KIM CAVDAR, MS3; MICHAELA JANSEN, PHARMD PHD

Adapting Team-Based Learning for Medical Education: A Case Study with Scalable and Resource

Introduction: Team-Based Learning, TBL is a learning strategy where students are able to apply conceptual knowledge in small groups through a sequence of activities that includes individual work, teamwork, and immediate feedback. TBL has been gaining popularity in many education institutions and programs across the world and in the US. This study is the genesis of transitioning to TBL as a major mode of instruction at TTUHSC. Through this initiative we presented TBL as an adaptable method to improve students' learning and examination outcomes.
Methods: TBLs are conducted in three steps: pre-class preparation, in-class readiness assurance testing, and application focused exercise. The present study followed an abbreviated format, consisting of pre-session preparation and in-class session with individual readiness assurance test (iRAT) and team readiness assurance test (tRAT) followed by immediate feedback. The in-class portion of each TBL session was 1 hour long. We then compared iRAT and tRAT and corresponding NBME scores.
Results: The results indicated that active learning increased examination performance by an average of 2.4% per TBL session attended. Furthermore, participation in an increasing number of TBLs was associated with increased iRAT scores and a decreased performance gap between highest and lowest performers, where the increase in the scores of lowest performers contributed more substantially to this phenomenon than the increase in the scores of highest performers. Students at both ends of the spectrum, highest and lowest performers significantly, benefited from group discussion.
Conclusions: Observed learning strategies during tRAT that have been demonstrated to be effective include elaboration, dual coding, specific examples, interleaving and retrieval practices. Overall, the results indicate that the students who participated in TBL sessions had significantly higher final grades as measured by NBME scores. This supports the hypothesis that group-based activities associated with TBL sessions encourage the reconsolidation of knowledge that students acquired previously, leading to better examination outcomes.

HANNAH CHAUDHURY B.S.; GRACE FOSU M.A., M.S.; DIANA VARGAS-GUTIERREZ PH.D.; GIPSY BOCANEGRA PH.D.; BILLY U. PHILIPS, JR., PH.D.

Health Disparities and Food Insecurity in West Texas

Introduction: Health disparities, exacerbated by socioeconomic determinants like healthcare access, insurance coverage, income levels and employment status, present a critical issue in the U.S. These disparities are evident within food deserts—areas the USDA's Economic Research Service identifies as having limited access to affordable and nutritious food. This highlights the issue of food insecurity and its impact on health. The study focuses on analyzing county data to elucidate the elements influencing health inequalities and food insecurity in West Texas, comprising 108 counties in the TTUHSC service region.
Methods: The study employed exploratory and descriptive analysis to explore public data relevant to health disparities and food insecurity. Basic geospatial analysis was also utilized to graphically show the results on maps.
Results: We analyzed different social and economic factors of health disparities in the 108 counties of TTUHSC's service region in 2019. Looking at socioeconomic factors, about 14% of the population reported a lack of adequate access to food while 9% had limited access specifically to healthy foods. In terms of employment and insurance, the results estimated 3% of the population as unemployed and 22% without insurance in the 108 counties. Concerning obesity, diabetes, high blood pressure, and high cholesterol, 38% of adults reported a BMI of > 30, 13% of adults were diagnosed with diabetes, 33% reported high blood pressure, and 32% reported high cholesterol, respectively.
Conclusions: The 108 counties in the TTUHSC service region exhibited pronounced disparities in food security and access to nutritious foods, alongside widespread health problems such as obesity, diabetes, high blood pressure, and high cholesterol. Moreover, there was a significant reliance on public assistance among its largely lower-income population.

TRISTIN CHAUDHURY, MS, HANNAH CHAUDHURY, BS, VIVIE TRAN, BS, CAEZAAN KESHVANI, MS, CHIP SHAW PHD, DR. ALAN PANG, MD, DR. JOHN GRISWOLD, MD

Hypercalcemia in Burn Intensive Care: A Retrospective Analysis with Implications for Patient Outcome Prediction

Introduction
Burn injuries are a major health concern in the United States and globally, causing approximately 180,000 deaths each year. These injuries lead to significant changes in serum calcium levels due to various factors, including bone metabolism imbalances, Acute Renal Failure (ARF), burn severity, and patient immobilization. This study, conducted at our university hospital, aims to investigate the complex causes of hypercalcemia in burn patients. A preliminary study of 200 patients revealed a strong correlation between peak calcium levels and acute renal failure, cardiac arrest, and total body surface area (TBSA). The hypothesis is that burn patients with higher severity, longer hospital stays, and renal issues will have a greater increase in serum calcium, potentially leading to higher morbidity and mortality.
Methods
The study was a retrospective, hypothesis-driven analysis of 832 burn patients. It used data from our hospital's burn registry and Electronic Medical Records to analyze calcium levels.
Results
After adjusting for age, comorbidities, and TBSA, a significant negative correlation was found between the lowest calcium levels (nadir calcium) and arrhythmias, renal failure, and overall morbidity. Interestingly, peak calcium levels did not correlate with these outcomes. Nadir calcium was inversely related to the length of hospital stay, mortality, and TBSA. Additionally, initial admission calcium levels showed a strong positive correlation with both nadir and peak calcium levels.
Conclusions
Contrary to the preliminary findings, no positive correlation was observed between peak calcium levels and arrhythmia, renal failure, or TBSA. The study highlights nadir calcium as a potential indicator of patient outcomes in burn-related injuries. The strong correlation between admission and nadir calcium levels suggests that fluctuations in these values could be significant in assessing patient outcomes.

SEAN DALY, BSA; CHERYL ERWIN, JD, PHD

On Practicing Medicine with Meaning: Challenges to Unearthing Spirituality Among Resident Physicians

Introduction: “Those who have a ‘why’ to live, can bear with almost any ‘how’.” These powerful words from Austrian Psychiatrist Viktor Frankl strike at the core of humanity’s longing for life to have a direction and sense of purpose. Amidst the broken spaces within medicine, a loss of meaning, especially among residents, can be the most troubling and must be restored. Within this paper, our focus is to identify possible causes behind a medical resident's lack of spirituality. Why is it so difficult for residents to ask themselves, ‘why’?
Methods: Through a comprehensive PubMed literature search filtering for topics relevant to the project and subsequent analyses of findings, there appear to be three major themes as to what may be holding residents back from choosing to fully pursue after meaning in their work.
Results: First, a lack of time for rest and reflection during the fast-paced demands of residency can lead to a resident not realizing that they should ask such thought-provoking questions in the first place, or result in a lack of time to fully answer them once asked. Next, a resident may have the thought to ask themselves such questions and may have adequate time to answer them, but then choose not to apply what they learn because they do not view it as applicable to their work. Simply put, they are in denial of the need for meaning. Lastly, a resident may realize the need to ask such questions, choose to ask and apply them, but then don’t know the next steps to fully live out these convictions.
Conclusions: With these factors identified, it is imperative that residents are both made aware of them and given the resources, including but not limited to contemplative exercises and information about different spiritual or religious practices, as possible solutions.

RACHEL DEGROOT; GRACE FOSU, M.A. M.S.; DIANA VARGAS-GUITERREZ PH.D.; GIPSY BOCANEGRA PH.D.; BILLY U. PHILIPS JR. PH.D.

Analyzing the Prevalence of Diabetes to Food Insecurity Rate in Rural and Urban Texas Counties

Introduction: A total of 37.7 million people (11.3%) of the U.S population has diabetes that is either diagnosed or undiagnosed as of 2022, placing a large burden on the US healthcare system, especially in rural communities. Food insecurity is now being recognized as a potential contributor to the development and control of diabetes. On an index of factors contributing to a healthy food environment Texas is ranked poorly compared to the national ranking, is second in the nation for states with the largest rural population and has a significant diabetes burden compared to other U.S. states. Therefore, social determinants of health in the context of rural and urban communities are especially important to consider when understanding diabetes in Texas.
Methods: This study involved the collection and review of public data regarding all rural and urban counties in Texas from online databases between 2010 and 2020. This was followed by exploratory, descriptive, and basic geospatial data analysis.
Results: On average, urban counties had a greater prevalence of diabetes (8.19%) compared to rural counties (7.28%). Observing measures related to food, urban and rural counties had the same rate of food insecurity. However, for measures of food environment index and limited access to healthy food, rural counties performed worse than urban counties on average. Conclusions: The results suggest that the more specific measures of healthy food and income, as quantified in the food environment index and limited access to healthy food rates, can better define the difference in diabetes prevalence found in rural versus urban communities. These measures appear counterintuitive as urban counties with worse diabetes rates had better income and healthy food access, but ultimately, the measures illuminate the need for further study into complex social attitudes and food related differences between these communities that measuring general food insecurity rates cannot provide.

COOPER DEUPREE, HATICE KURT, STEPHANIE STROEVER, AYA BOU FAKHREDDINE, REGINA BARONIA, WAIL AMOR

Variations in iCEB Values Based on Age in Patients with Acute Alcohol Intoxication

Introduction:
Neuroinflammation, which can also be accompanied by increased cerebral cytokine production, has a significant impact on the pathogenesis of many neurological illnesses, including loss of BBB integrity and ischemic stroke, yet effective treatment choices are currently lacking. Although little is known about metformin (MF), a commonly prescribed first-line antidiabetic drug, prior research suggested that it may be useful in preventing BBB deterioration and the increased risk of stroke caused by tobacco smoking (TS). Hence, the present study was designed to explore the potential role of MF against stroke and TS-induced neuroinflammation.
Method:
Primary neurons and astrocytes isolated from mice brains were exposed to OGD/R and TS extract and pretreated with MF. Cellular total ROS was measured in primary neurons using CM-H2DCFDA as a probe. The level of pro-inflammatory and anti-inflammatory cytokines was measured in primary neurons and astrocytes by RT-PCR and the brains of adolescent mice through immunobead assay. Western blot analysis evaluated the expression of antioxidative markers (NRF2, NQO1, and HO-1) and that of the proinflammatory modulator NF-κB. Nicotine and cotinine concentrations were measured through LCMS.
Results:
Our studies revealed that MF suppressed the release of pro-inflammatory mediators like TNF-α, and IL-1β by targeting the NF-κB signaling pathway in primary astrocytes and neurons. MF also upregulated anti-inflammatory mediators, such as IL-10, and IL-4 by upregulating the Nrf2-ARE signaling pathway. Adolescent mice receiving MF along with TS also showed a significant decrease in NF-κB expression compared to the mice not treated with MF and significantly decreased the level of TNF-α, IL-1β, MCP-1, and MIP-2 and increased the levels of IL-10 and IL-4 through the activation of Nrf2-ARE pathway.
Conclusion:
These studies support that MF could be an excellent candidate drug for the treatment and or prevention of TS-induced neuroinflammation and ischemic stroke.

The work was supported by R01NS117906.

MITCHELL DEVOLDER, MOHAMMED M. ANSARI, M.D.

Early Use of Impella in STEMI Complicated by Arrhythmogenicity Improves Recovery.

Introduction: One of the common causes of death related to STEMI are arrythmias such as ventricular fibrillation (VF). In VF the heart is not pumping blood efficiently enough to meet the metabolic demand of vital organs. This hemodynamic collapse is called cardiogenic shock. Cardiogenic shock is usually treated with hemodynamic support such as intraaortic balloon pump (IABP), Impella and medical therapy. The invention and adoption of new Impella devices has been effective in the treatment of cardiogenic shock but IABP is still commonly used. Certain comorbidities like arrhythmogenicity of the heart may not respond well to IABP therefore Impella can be adopted as in our case.
Case Presentation: Female age 63, with a PMH of HTN, HLD and RA presented to the ER for severe chest pain. EKG in ER showed STEMI. In the Cath Lab, angiography showed critical left main and LAD disease. She then had a VF arrest and ACLS was performed, IABP placed. However, she continued to have episodes of VF, so the decision was made to escalate support with Impella CP (4-0). Intervention was able to proceed, and she had no more arrhythmic episodes. The patient then left the Cath Lab in stable but critical condition. Post-op TTE showed EF <20% which gradually increased to 35-39% over the next four days. The Impella was subsequently removed.
Conclusion: Our case demonstrates that early escalation to Impella devices in cardiogenic shock complicated by arrhythmogenicity can provide increased offloading of the heart and faster recovery of the myocardium without causing end organ ischemia. Our patient was shocked three times before and no times after Impella placement. In the case of arrhythmogenic post MI presentations, Impella can be considered a beneficial tool for decreasing the risk of recurrent arrest and permitting increased patient recovery.

ALISTAIR R. DISRAELI, BA, NEHA MITTAL MD

Disparities in Osteoporosis Screening for High-Risk Men - With COPD on Chronic Oral Steroids

Introduction:
Osteoporosis is a growing concern in an aging population and leads to fragility fractures, increasing morbidity and mortality. COPD patients exhibit 2-to-5 times higher osteoporosis prevalence.1 Oral corticosteroid use is also linked to cumulative bone density loss.2 Despite these risks, screening rates for eligible individuals remain suboptimal. Furthermore, screening within high-risk males is substantially low as USPSTF states there is insufficient evidence to screen men and does not specify high risk.3
The cohort that is at the highest risk of osteoporosis in men are those who are over 65, with COPD, and on oral steroids.4 Our study aims to investigate screening rates and fragility fractures in this high-risk population.
Methods:
Charts of patients in Lubbock, TX were accessed for ICD-10 codes of COPD that included sex, steroid use, fragility fractures, and osteoporosis for patients seen from January, 1, 2019 – April 27, 2023.
Results:
Of the 196 eligible COPD patients, 122 individuals were above age 65. Of these 122, 21 (17%) were screened, 20 of 62 (32.3%) females, 1 of the 60 (1.7%) of the males. Of the 36 on oral steroids, 8 (22%) were screened, 7 of 16 (43.8%) females, 1 of 20 (5%) males. Of these high-risk individuals, 13 of the 36 (36.1%) had a fragility fracture, 9 of 16 (56.3%) females, and 4 of 20 (20%) males.
Conclusions:
Females over 65 with COPD on oral steroids are screened at the highest rate, 43%. In contrast, men with the same risk factors are screened only 5% of the time. This stands in contrast to the rate of fragility fractures experienced between men and women. While women do suffer more fragility fractures at 43.8%, 20% of the men at the highest risk still experience them. This suggests the need for further investigation.

JACKSON DRISKILL, MBA; HAFSA ZUBERI, BS; & MICHELLE TARBOX, MD

Structural Recommendations for University-Affiliated Student-Run Dermatology Free Clinics

Free clinics serve as a healthcare access point to a diverse and underserved patient population, linking millions of Americans with medical care annually. However, only a fraction of free clinics provides dermatology services on-site. Furthermore, no consensus exists on how institution-affiliated student-run free clinics should provide specialty care. The Texas Tech University Health Sciences Center (TTUHSC) School of Medicine, TTUHSC Department of Dermatology, and Lubbock Impact Free Clinic have collaborated to host a monthly dermatology free clinic night to serve the uninsured population of Lubbock, Texas since 2010. The need arises from healthcare barriers that this population can face, including delayed diagnosis and inadequate treatment of dermatologic issues. We provide a blueprint on how medical students and physicians partner to see patients and what resources a free clinic can provide for dermatologic care so that other medical institutions can use this model to guide their efforts in establishing their own free clinics.

JAINA ECKERT; LIZA GARCIA; HANNAH CHAUDHURY; DR. ALAN PANG, MD; DR. JOHN GRISWOLD, MD, FACS

Treatment of Full Thickness Burn Injury with a Biodegradable Temporizing Matrix with On-The-Spot Simultaneous Application of an Autologous Skin Cell Suspension Device: A Case Series

Over the past decade, novel options have provided promising approaches into the conundrum of how to best treat full thickness burns. The primary objective of proper resuscitation and adequate skin coverage is a balancing act between fighting infections, insensible loss, and metabolic imbalances. Previously, dermal substitutes have been the traditional treatment option for full thickness burns, but availability and acquisition time delays treatment, further increasing the risk of mortality despite advances in treatment options. Recent studies have shown the use of a dermal substitute as an initial treatment option, followed by the use of an autologous skin cell suspension with or without skin graft treatment for severely burn patients. The primary purpose of this case series is to describe the treatment course of severely burn patients using NovoSorb Biodegradable Temporizing Matrix™ (BTM) as the dermal substitute with simultaneous on-the-spot application of RECELL™ Autologous Cell Harvesting Device as a unique approach to the initial treatment of full thickness burns. Our case series reviewed 4 patients with TBSA ranges of 30-90% who showed early epithelization upon delamination of BTM. Although only a small fraction of each patient's TBSA received the simultaneous treatment of BTM and RECELL, the areas that underwent this approach resulted in as much as 50% epithelization of the treated TBSA. This demonstrates clinical significance which merits further investigation to determine statistical significance. This simultaneous application of BTM with RECELL presents an opportunity to minimize delay in treatment and decrease time of wound healing by reducing fluid loss, metabolic imbalances, and potential risk for infection.

CAROLINE FINNEY, BA; KATHERINE LAKEY, BS; KOLL RADA, BS; DR. ALAN PANG, MD

Disparities in Gynecologic Oncology: Descriptive Study of Changes in Medicare Reimbursement Rates in the United States

Introduction. Medicare reimbursement is declining across the United States. The current study examines the most common gynecologic oncology procedure billing codes to quantify the decline in Medicare coverage and determine geographic disparities in access to care. We predict that Medicare coverage will decrease across the United States for gynecologic oncology procedures 2013-2021. We expect that the Medicare coverage rate of decline will be higher in the northeastern and southern United States due to higher healthcare spending.
Methods. The Center for Medicare and Medicaid Services (CMS) database was utilized to gather the percentage of Medicare coverage for 25 gynecologic oncology billing codes. The rate of decline in Medicare coverage for these codes was compared by region, state, and type of cancer for 2013-2021.
Results. All 50 states showed a significant decline in Medicare coverage from 2013-2021. Significant differences in Medicare coverage were found between regions of the United States. The average Medicare coverage from greatest to least by region was Southern, Western, Midwest, and Northeast. Significant differences in rate of decline were found by state with the largest declines found in Wyoming, Utah, and North Dakota. Significant differences were found in the rate of decline of uterine, cervical, and ovarian cancer procedures. Uterine procedures had the greatest rate of decline in comparison to cervical and ovarian. Lastly, the average Medicare coverage from greatest to least was ovarian, cervical, and uterine procedures.
Conclusion. There is a significant decline in Medicare coverage across the United States for the most common gynecologic oncology tests and procedures. Geographic disparities exist in regions of the United States with the lowest coverage in the highest healthcare spending regions. Medicare coverage could impact gynecologic oncology access to care.

RILEY FORTNER MS; VIVIE TRAN; ALYSON WILLIS; STEPHANIE STROEVER PHD, MILOS BUHAVAC MD

Shock Index as a Predictor of Fibrinolysis Phenotype

Introduction
Fibrinolysis is undesirable in trauma patients where hemorrhage is a concern. Anti-fibrinolytic agents are a popular method to mitigate fibrinolysis in these patients, and we propose that identifying an indicator for fibrinolytic phenotype (FP) can improve treatment efficiency. We hypothesize that the easily measured shock index (SI) can predict FP.
Methods
We performed a retrospective study of level 1-2 trauma patients admitted to a level I trauma center between January 2018 and December 2022. Adult patients who had at least one thrombolystography (TEG) within six hours of admission without prior tranexamic acid treatment were analyzed. The primary predictor for fibrinolytic phenotype was SI on admission and the gold standard was lysis at 30 minutes (LY30) from TEG analysis. We defined hyperfibrinolysis as LY30 >7.7%, physiologic as 0.6 – 7.6%, and shutdown as <0.6%. A non-parametric receiver operator characteristic (ROC) curve with pre-specified cut-points for SI (<0.6, 0.6-0.99, 1.0-1.39, ≥1.4) assessed the sensitivity and specificity of SI to separate phenotypes.
Results
We included 202 patients; 119 (58%) had an injury severity score of severe or worse (>15). Additional summary data are in Table 1. There were two patients with the hyperfibrinolytic phenotype, 39 with the physiological, and 161 with the shutdown type. The median SI was 0.81 with interquartile range of 0.61-1.1. The area under the ROC curve calculated for SI to discriminate between physiologic fibrinolysis and shutdown was 0.54.
Conclusion
We can conclude that SI is not predictive of FP among patients with this criteria. In the interest of patient benefit, we will continue to search for other early markers that indicate the need for tranexamic acid. Further refinement to mitigate confounding variables is needed to further assess SI and other predictive indicators.

FRANK FRANKOVSKY, MS2, STEPHANIE STROEVER, PHD, MPH, CAMERAN MECHAM, DO, ANDREA WEITZ, MD, MPH, COLTEN LANNING, MS1, ANDRES RIOS, MS1, MILOS BUHAVAC, MD, FACS, JAMES MORRIS, MD, MPH, FACEP

Barriers to early adoption of novel program to train and evaluate resident performance as trauma team leaders

Objectives:
Training Emergency Medicine residents in trauma leadership is a critical component of EM residency programs. Routine evaluation of the program revealed a perceived “feedback desert” in trauma education. Thus, faculty within the Emergency Medicine department developed a quality improvement program featuring a standardized direct observation tool (SDOT) to provide structured methodology for training residents as trauma team leads, documenting critical aspects of the case and provides structure for actionable feedback that is reviewed with residents before the end of day. This program was implemented for a pilot period of 3 months, and a process review during the first month demonstrated key barriers to early adoption of the program.
Methods:
A designated member of the team collected weekly feedback via semi-structured interviews with resident leaders and faculty. The team used thematic content analysis from the field notes to determine key barriers to early adoption of the new program.
Results:
Thematic analysis revealed three common barriers to early adoption of the SDOT program: lack of buy-in from EM faculty not involved with the QI project, challenges with interdepartmental cooperation, and inconsistency in SDOT form completion. The lack of early buy-in from EM faculty was principally due to an increase in “paper burden” without evidence of benefit to the resident.
Interdepartmental cooperation between the primary trauma leads, surgery and EM, served as a unique barrier where some EM faculty perceived the SDOT as an opportunity for surgery faculty to criticize EM residents. Lastly, the absence of formal training to complete the SDOT form itself resulted in inconsistent implementation, like residents completing the form themselves, with many forms missing key data.
Conclusion:
Process evaluation is a critical aspect of QI program evaluation. The barriers identified during the first month of the pilot enabled program leadership to address barriers and adjust processes for greater success.

RICARDO ISAIAH GARCIA, SACHI KHEMKA, ARYAN KIA ROGHANI, RUHANANHAD P REDDY, VASANTHKUMAR PATTOOR, MICHAEL JACOBS, AANANYA REDDY, UJALA SEHAR, P. HEMACHANDRA REDDY

Caregiving for patients with Alzheimer's Disease: A Focus on The Hispanic Caregivers in West Texas

A caregiver is a constantly evolving role that an individual most likely undertakes at some point in their lifetime. With discoveries and research in increasing life expectancy, the prevalence of neurological-related diseases, such as Alzheimer’s Disease (AD) and Dementia, is certainly likely to require more caregivers. In fact, according to the Alzheimer’s Association, as the age of those above 65 continues to rise, it will be just as likely that there will be an increase in the number of people with AD and other types of Dementia. The demand for Alzheimer's caregivers is escalating as the prevalence of the disease continues to rise. With Alzheimer's and other neurological disorders like Dementia becoming more prevalent, this article will attempt to expand upon the status of caregivers concerning their economic, health, and cultural statuses. This article will focus primarily on Hispanic caregivers in relation to their Non-Hispanic (NH) white counterparts because according to Alzheimer’s Association Hispanics are approximately one and one-half times more likely than NH whites to have Alzheimer’s and other dementias. We will attempt to focus on the Hispanic caregivers that live in Texas and more specifically, West Texas due to the lack of current literature that applies to this area of Texas. Lastly, we discuss the ramifications of a multitude of factors that affect caregivers in Texas and attempt to provide tools that can be readily available for Hispanics and others alike.

AVERY GARCIA, BS; DR. ROBYN RICHMOND, MD; DR. STEPHANIE STROEVER, PHD, MPH

Exploring the Association between Trauma Readmission Rates and Travel Distance at a Rural Level 1 Hospital: A Quantitative Analysis

Introduction: The research investigates the correlation between trauma readmission rates and travel distance from a rural Level 1 Hospital. The study was propelled by the hypothesis that greater travel distances correlate with higher 30-day unplanned readmission rates post-trauma.
Methods: This retrospective study analyzes the trauma registry at University Medical Center (UMC) during 2022, focusing on adults aged 18-89. The data points aim to explore 30-day readmission rates while capturing demographic and clinical variables, such as comorbidities, length of stay (LOS), and primary diagnoses, among others. We used descriptive statistics to profile the study population and multivariable logistic regression to examine the relationship between travel distance and readmission rates, controlling for various potential confounders.
Results: The study encompassed 2818 patients, predominantly male (65%) and white (93%), with a mean (SD) age of 51 (20.8) who experienced traumatic injury during the year of 2022. The overall readmission rate within 30 days was 5.64%, with 49 readmissions planned (1.74%) and 110 readmissions unplanned (3.9%). Analysis revealed a mean travel distance to UMC of 96 miles, ranging from 0 to 1535 miles. Logistic regression highlighted a significant association between increased travel distance and lower unplanned readmission odds (AOR = -0.003; 95% Cl [-0.005, -0.001]; p-value = 0.014)
Conclusions: Contrary to the initial hypothesis, the study revealed that increased travel distances to a rural Level 1 hospital were associated with a decrease in unplanned readmission odds. This unexpected finding challenges preconceived notions and literature about geographic barriers in healthcare accessibility and their impact on patient outcomes. However, it highlights the complexity of factors influencing trauma readmissions and suggests the need for further research to understand the underlying causes and implications of this trend. This insight is crucial for informing future healthcare policies and strategies, particularly for a medical hub that serves a vast rural population.

CAMILLE GAVIN; ANUTHTHARA LOKUBANDARA; APRIL GORMAN; DR. ABU MINHAJUDDIN, PH.D.; DR. REGINA BARONIA, MD; DR. SARAH WAKEFIELD, MD

The Impact of Family Structure and Family Income on Adolescent Well-being

Introduction: Many studies are exploring the social determinants of mental health. These include socioeconomic status (SES) and family structure. While each may have its own impact, there is likely an interplay between these factors. Methods: Data from the 12 participating sites (Schools of Medicine) in the Texas Youth Depression and Suicide Risk Network (TX-YDSRN) on family structure, SES, anxiety (GAD-7), depression (PHQ-A) and resilience [Youth Thrive Survey (YTS)] were analyzed using ANOVA. All participants in TX-YDSRN met previously determined criteria for depression severity or suicidality. Results: 630 participants, ages 12-17, were included in this study with 351 being from two-parent (2P) households and 279 from one-parent (1P) households. Majority of participants were female and white, with fairly even split identifying as Hispanic and non-Hispanic. In 2P, 50.7% of households classified in income level at or above $100,000, while in 1P, 56.4% of households classified in income level at or below $50,00. There is a statistically significant difference between 2P and 1P in youth resilience measured as social connection (p=0.037) and concrete supports (p=0.025). 2P households scored greater ability in both social connection and concrete supports. There is also a statistically significant difference in concrete support (p=0.0001) across different income levels. When the income level is held constant, the difference between 2P versus 1P is only significant for concrete supports (p=0.001). Conclusion: From the preliminary analysis, income seems to be the stronger predictor of resilience factor as shown by concrete supports. YTS manual defines concrete support as ranging from access to healthcare, knowing how to get help with schoolwork to relational difficulties, as well as learning to make good decisions. Higher income allows access to more resources for various health and emotional needs, but also highlights how disparities may impact mental health outcomes.

COLBY GORDON MSHP; DR. ELISABETH CONSER MD

FACEing Foster Care: A structured 'teaching students to teach' model to support medical students' understanding of health needs in foster care.

According to the Department of Family Protective Services data as of February of 2023, there are 248 total children in foster care, with 175 of those children being placed within the region. Due to the nature of foster care placements, this population often receives fragmented care that is aimed at solving immediate issues rather than instilling a foundation of health and prevention. According to the American Academy of Pediatrics (AAP), the 'majority of children entering foster care have lived in deprived and chaotic environments for a significant period of time until removal'. Additionally, the AAP has classified such children as a population with special health care needs. Key recommendations from the AAP's policy for Children and Adolescents in Foster Care and Kinship Care include "become educated on the special health care needs of children and adolescents in foster care and assist other professionals in addressing these needs." Therefore, our project aims to address educational health care disparities for children in foster care while increasing awareness among medical learners regarding the needs of this vulnerable population through the integration of medical lessons with art experiences.
Methods: Under exemption from the QIRB for program evaluations, participants from 2023 were surveyed through Qualtrics for if formalized curriculum enhanced student's perceived improvement of teaching methods and connection to children in foster care. The primary analysis will perform relevant descriptive statistics of the sample including mean/standard deviation for normally distributed continuous variables or median/interquartile range for skewed continuous variables.
Results: Preliminary results show volunteers possess little exposure toward key demographics, with 88% reporting limited or no exposure to foster children (n=25). The lesson plan overall and its component's perceived importance, quality, and satisfaction is extremely well received. Conclusions: Confidence levels in teaching, understanding, and impact highlights enhancement of self-efficacy in delivering high-quality education.

ADITHI GOVINDAN BS, MUNEEZA SHEIKH BS, ALI RIZVI BS, EMEKA ODUKWU, ELLIE CANNON BS, JUNIOR CLARK BS, MEGAN MURCHISON BS, FIONA PRABHU MD

Behavioral Health Prevalence and Outcomes at The Lubbock Impact Free Clinic

Background:
Mental health affects a significant portion of the underserved population in the US. Student Run Free Clinics in the US have attempted to address this issue by providing psychiatric or behavioral health medical care. Few studies evaluate the efficacy of the behavioral health program, and few clinics have an onsite pharmacy that prescribes psychiatric medications. Our study aims to find the prevalence of mental health conditions at the Free Clinic and evaluate the efficacy of our Mental Health Night (MHN) program.
Methods:
Retrospective study of patient charts to determine demographics of the population, comorbidities, and psychiatric diagnoses. After collecting data, we plan to conduct basic statistical analyses (ANOVA, T-test, and chi square) to compare three groups - patients who attended mental health night, patients who opted into MHN but did not come to the appointment, and patients who opted out of MHN.
Results: We predict that patients who opted in for mental health services will have a lower mental health screening score than those who opted out of services. We predict that screening scores of patients will decrease after receiving services through our mental health nights. (will have preliminary data by SRW)
Conclusion: The addition of psychiatric care, including psychiatric visits and medications, is essential to address the high prevalence of psychiatric diagnoses amongst the underserved population. Therefore, we should continue to evaluate the efficacy of the clinic and determine any necessary additions to our current mental healthcare program.

ALI HAGGAZ B.S, MATHEW FOGARTY, PH.D, OBAID KHURRAM, PH.D, CARLOS MANTILLA, M.D PH.D, GARY C. SIECK, PH.D

C2 Spinal Cord Injury Reduces Mitochondrial Volume Density in Phrenic Motor Neurons

The diaphragm muscle (DIAm) is the major inspiratory pump for breathing. Neural control of the DIAm during breathing involves the recruitment of fatigue resistant motor units comprising smaller phrenic motor neurons (PhMNs), which innervate type I and IIa fibers. More fatigable DIAm motor units comprise larger PhMNs that innervate type IIx/IIb fibers, which generate greater forces but are more fatigable. Thus, there are marked differences in the activation history of DIAm motor units. PhMNs located in the cervical spinal cord (C3-C5) receive excitatory input from medullary premotor neurons, which are primarily ipsilateral. Thus, C2 spinal cord hemisection (C2SH) disrupts the neural pathway essential for breathing. Consistent with their higher activity levels, previous studies from our lab have shown that smaller PhMNs and type I and IIa DIAm fibers have greater mitochondrial volume density (MVD).Therefore, we hypothesized that C2SH significantly reduces MVD of smaller PhMNs. In Sprague Dawley rats, PhMNs on both sides were retrogradely labeled by intrapleural injection of cholera toxin B (CTB) 3 days prior to C2SH (right side). DIAm EMG activity was recorded on both sides by inserting bipolar electrodes. Mitochondria were labeled by intraspinal injection of MitoTracker Red and imaged in identified PhMNs using 3D confocal microscopy. A series of optical slices (0.5 μm) of PhMNs were deconvolved to improve contrast, then thresholded for MitoTracker labeling followed by 3D reconstruction. In sham rats, the MVD of smaller (lower somal surface area) PhMNs was higher compared to larger PhMNs. C2SH reduced DIAm EMG activity on the ipsilateral side across a 14-day period, while activity on the contralateral side increased. After 14 days, C2SH reduced MVD by ~25% in smaller PhMNs on the ipsilateral side. We conclude that the reduced activity of smaller PhMNs induced by C2SH induced mitochondrial morphological changes, due to reduced mitochondrial biogenesis.

NICK HANCOCK, BS, TRISTIN CHAUDHURY, MS, JOEL BATEMAN, BS, HANNAH CHAUDHURY, BS, CARSON BATEMAN, BS, ALEXANDER DORIUS MBA, ZHENG SHI MD

National and Geographic Variation in Medicare Reimbursement Changes for Top Radiation Oncology Procedures From 2013-2022

Introduction
The current study delves into the changing Medicare reimbursement landscape for radiation oncology, a critical issue in healthcare finance. It emphasizes the need to understand how Medicare reimbursement dynamics, particularly for radiation oncology, affect healthcare delivery and policy. This research provides an in-depth analysis of the changes in reimbursement rates over the past decade, focusing on their considerable geographic variation and potential impact.
Methods
Reimbursement rates for top-grossing radiation oncology procedures were evaluated using data from the Physician Fee Schedule of the Center for Medicare and Medicaid Services. These rates were adjusted for inflation using the consumer price index. The study emphasized procedures based on their gross revenue, and both annual and total percentage changes in reimbursement were calculated for each U.S. state and territory.
Results
Between 2013 and 2022, inflation-adjusted Medicare reimbursement for key radiation oncology procedures fell by an average of 20.1% and a median of 20.3%. The most significant decreases were observed in Illinois, Michigan, Kansas, and Florida, while the least change occurred in Maine, Massachusetts, Washington, and Puerto Rico. Notable procedures, such as radiation treatment management and radiation therapy planning, showed yearly percent decreases ranging from -1.80% to -1.90%.
Conclusions
The study reveals a substantial decline in Medicare reimbursements for radiation oncology across a decade, marked by notable geographic disparities. These variations could affect the economic sustainability of radiation oncology practices and exacerbate existing inequalities in healthcare access based on income, education, and location. The findings call for policymakers to acknowledge these disparities and develop targeted strategies to mitigate the consequences of these trends.

ALEX HEO; KYLE GU; EDWARD SUN; DAN STUART; REGINA BARONIA; POORVANSHI ALAG

Suboxone Symphony: Micro-Moves from Methadone Mastery

Introduction: Micro-induction of buprenorphine in patients with opioid use disorder (OUD) serves as an avant-garde approach to taper patients off full opioid agonists with minimal withdrawal. Micro-induction involves the administration of small, increasing doses of buprenorphine, a partial agonist, to patients taking full opioid agonists. Once optimal therapeutic dose is achieved, there is complete cessation of full agonists. Buprenorphine's advantages include its safety due to its ceiling effect and lower abuse potential when combined with naloxone. This review of clinical outcomes accentuates the benefits and limitations of micro-induction.
Methods: EMBASE and Pubmed were explored for studies that tested the efficacy and safety of micro-induction. Inclusion factors were patients that underwent micro-induction solely with buprenorphine or combined with naloxone (Suboxone), and exclusion factors were patients that were not treated by micro-induction. 46 articles were analyzed to assess patients' treatment tolerance and withdrawal symptoms both during and after treatment. In most studies, efficacy and safety were measured through instances of relapse and self-reported withdrawal symptoms denoted in the Clinical Opioid Withdrawal Score (COWS).
Results: Across 46 studies, 38 articles substantiated the safety and efficacy of micro-induction while minimizing withdrawal symptoms throughout treatment. These 38 studies entailed both inpatient and outpatient settings. 36 studies involved patients over 18 years of age. 10 of our studies used a rapid micro-induction method compared to the traditional Bernese method and found favorable results.
Conclusion: Micro-induction is promising as an effective method to treat patients with OUD. Adverse outcomes included patients who experienced withdrawal symptoms during treatment. There was a minimal number of patients who returned to use of full opioid agonists in our reviews, but this may have occurred due to lack of long-term follow-ups. There is a scarcity of research, and conducting broader patient trials would contribute to advancing our understanding and making progress in this area.

CRISTIAN HERNANDEZ B.B.A., MARCOS ARCINIAGA B.S., DR. LASZLO NAGY M.D.

Unseen case of Unresectable Fibrous Dysplasia of the Cervical spine

Introduction: Fibrous dysplasia is a non-malignant bone tumor where normal bone and bone marrow is replaced with fibrous tissue There are two categories of fibrous dysplasia (FD), monostotic and polyostotic Monostotic fibrous dysplasia is the metastatic replacement of the medullary part of only one bone, while polyostotic fibrous dysplasia is the metastatic replacement of multiple bones. Monostotic and polyostotic fibrous dysplasia of the spinal column is rare . In recent studies the incidence of fibrous dysplasia is 3.6 in 1,000,000 people, and incidence peaks in the ages of 11 to 20. The ACVR1 gene is a BMP-1 TGF-B receptor in the TGF-B family and is seen in fibrous dysplasia ossificans progressiva. Methods: A 7-year-old female patient diagnosed with fibrous dysplasia after coming to the clinic with hip pain. In the coming years FD continues to spread to the cervical vertebrae fusing the vertebral bodies of C4-C7 and the facet joints of C3-C7. Results: Genetic testing comes back with an ACVR1 gene mutation. The cervical vertebrae are completely fused the bone lesion is unable to be resected. Most recently, the patients' pain has begun to resolve with only minimal neck pain and cracking sounds when moving neck.
Conclusion: This patient's presentation of cervical fibrous dysplasia with an ACVR1 mutation is unknown in the literature. Traditionally cervical fibrous dysplasia is surgically removed, but in this case the vertebrae are completely fused, and surgery is not an option. This case highlights the importance of continuing research, and understanding of fibrous dysplasia which can be used to better treat a rarely seen disease.

SARAH NEAL SECREST HORNE MPH, MPA; BENNETT SCHACKMUTH; CHARLES L. SECREST M.D.; JOHN GARZA PH.D.

Trends in Complications from Inflatable Penile Prosthesis: A Population Level Analysis

Introduction
As inflatable penile prosthesis (IPP) placement complications have historically proven to engender substantial financial and physical burdens for patients and healthcare organizations, it is crucial to maintain a current understanding of the landscape of IPP complications and whether the current means of addressing them has shown effectiveness in reducing their rates. Our objective is to determine the characteristics of and trends in IPP complications in a large population to facilitate comprehensive surgical planning.
Methods
A retrospective population-based cohort study was conducted utilizing the 2016-2022 Texas Inpatient Public Use Data File. Patient characteristics were summarized using the Deyo modification of the Charlson comorbidities and available demographic information. Negative binomial regression was applied to estimate the annual percentage change (APC) and 95% confidence interval (95% CI) for the number of hospitalizations with IPP complications overall, and for the subcategories of infection, breakdown, displacement, and other mechanical problems.
Results
750 hospitalizations were identified with ≥ 1 IPP complication. Hospitalizations with IPP complications were mostly older (69.1% aged ≥ 65 years) and white (53.1%). Prevalent comorbidities were diabetes (54.0%), renal disease (27.6%), and congestive heart failure (17.9%). The most common IPP complications were infection (70.5%) and mechanical problems (20.0%). The least common were breakdown (9.6%) and displacement (9.6%). The total number of hospitalizations with any IPP complications had an increasing trend (APC 10.9 [95% CI 2.6 - 19.9]). Individual categories of IPP complications had statistically insignificant APC.
Conclusions
As the insertion of an IPP remains the gold-standard for surgical correction of erectile dysfunction after failed conservative measures, these results should urge clinicians to strongly evaluate their current approach to IPP placement. Patients with risk factors for IPP complications need to be optimized prior to surgery with the aim of improving patient outcomes in the context of evidence-based medicine.

SUYASH JAIN, MBA; DR. STEPHANIE STROEVER, PHD, MPH; DR. MILAN BIMALI, PHD; SHRUTI PATEL, MBA; NAMRATHA MOHAN, MBA; AKASH DEV, MBA

Using Structural Equation Modeling to Identify Construct Contributions to the Modified Frailty Index (mFI)

Introduction: The modified frailty index (mFI) quantifies reduced physiological reserve and vulnerability in patients. It is calculated by dividing deficits present by the total possible deficits. Deficits include symptoms, diseases, and disabilities that increase with age (e.g., cognition, performance, comorbidities). Two major mFI versions exist: mFI-5 and mFI-11, with 5 and 11 factors, respectively. Both correlate positively with health decline and mortality. This study focused on the Trauma Quality Improvement Program (TQIP) which encompasses over 900 trauma centers submitting data on 1+ million patients annually. Prior studies show that mFI-5 and mFI-11 are equally effective for outcome prediction, but stratification of weighting factors requires further research for maximal clinical utility.
Methods: We obtained 291,496 observations from the TQIP database based on inclusion criteria of individuals 65 and older and ICD-10 codes pertaining to blunt or penetrating trauma (e.g., S00.8 and S00.9). We then divided the sample in half – an explanatory and a confirmatory sample – to conduct both explanatory and confirmatory factor analysis. This structural equation modeling was done using Stata/MP and R Studio.
Results: Confirmatory factor analysis with half of the data demonstrated a moderate fit to the model (0.88) using 1 factor ("Frailty") informed by the 5 items (COPD, congestive heart failure, diabetes, functional status, hypertension). Based on the analysis, hypertension and diabetes had the highest factor loadings. Exploratory factor analysis showed that the data represents two latent constructs instead of a singular measure of frailty. One construct was composed of diabetes and hypertension, while the other was composed of COPD, congestive heart failure, and functional status. This demonstrated a better fit to the model (.99).
Conclusions: Our data shows that diabetes and hypertension contribute more information to the frailty factor than the others. More research is needed on the implications of the concept of two constructs of frailty.

DELANEY JENSCHKE; CLARISSA CLIFFORD; ANACLAIRE HENDERSON; HAOTING HUO; CONRADO JIMENEZ; D. PAUL MCDANIEL; ERIKA ORLOV; SHIVAM PATEL; KYLE SCHNELL; GRANT TEKELL; KALA TURNER, JENNIFER WARD MD; KEELEY HOBART MD; BETSY JONES EDD

FMAT Students Develop an OSCE Clinical Reasoning and Communication Case for Pre-Clinical Student Peers

Purpose: Our institution has a 3-year MD curriculum leading to FM residency, the FMAT program, which includes a systems-based 8-week course between the M1 and M2 years that focuses on the top 24 diagnoses in primary care. The course also uses a unique method of training for and assessing clinical competence in pre-clinical students—the Student-Generated Simulated Clinical Encounter, which provides opportunities for real-time teaching for students who generate the patient case, for those who serve as student doctors, and for those who observe. Over two years' summer session, students and faculty have worked together on a project to develop, implement, and assess an innovation in medical student teaching for future family physicians.
Methods: For this initiative, FMAT students studied strategies for integrating clinical reasoning skills in primary care and integrating opportunities to practice those skills in their simulated clinical encounters. They created and implemented an OSCE case that was used for a clinical skills simulation for their entire MS2 class and involved MS2 students in serving in key simulation roles: simulated patients and family members, student doctors, and differential diagnosis teams. Facilitators were faculty, residents, and MS4 students.
Results: One case developed by FMAT students was chosen to be used in a half-day simulation for the entire M2 class. Pre- and post-simulation assessments show strong positive improvement in MS2 students' assessment of their own confidence, especially in developing a differential diagnosis and giving an oral presentation. Also strongly positive are MS2 students' assessment of the large-scale simulation focusing on clinical reasoning
Conclusions: The session assessment results, learning outcomes and student perspectives about case development, integrating evidence-based communication strategies into simulated clinical encounters and their effectiveness as an opportunity for clinical reasoning practice.

KETAN JOLLY, BS MS; CADE CRUMP BS

Examining Adherence to AAOS Guidelines for Distal Radius Fractures: Identifying Treatment Trends

This study aimed to investigate the adherence of physicians to the American Academy of Orthopedic Surgeons (AAOS) Clinical Practice Guidelines (CPG) and Appropriate Use Criteria (AUC) for treatment of distal radius fractures and to explore the factors influencing their decision to favor conservative or surgical treatments. The need for this review is supported by inconsistent reporting on physician adherence to the AAOS CPG and AUC in previous studies.
Distal radius fractures are common in adults, often caused by falls, sports injuries, or accidents. Treatment options include casting, splinting, and various surgical interventions. The AAOS provides guidelines for managing these fractures, aiming to standardize treatment and improve outcomes. Studies have reported inconsistent adherence to these guidelines among orthopedic trauma surgeons. While some research suggests general adherence, other studies have found low agreement between actual treatments and the recommended guidelines. Understanding and addressing factors contributing to non-adherence is crucial for improving patient care and informing guideline updates. The optimal timing of surgical intervention for distal radius fractures and its impact on outcomes remain areas of ongoing research.
This retrospective study reviewed patient charts to classify distal radius fractures based on AAOS indications. These included AO/OTA Fracture Type, Mechanism of Injury, Pre-Injury Activity Level of Patient, Patient Health, and Other Injuries (in addition to distal radius fracture). Physician adherence to AAOS Appropriate Use Criteria (AUC) by categorizing treatments as "Appropriate, May Be Appropriate, or Rarely Appropriate" as determined by the median rating of treatments per AAOS experts.
The results of the study found that high median ratings for the selected treatment (Appropriate per AAOS guidelines) were not associated with a decreased need for revision surgeries. Additionally, treatments administered by physicians at TTU were consistent in adhering to AAOS guidelines for treatment.

BECKY JOSEPH, BS, KRITIN K. VERMA, MBA, HELEN CHEN, MD, DANIEL P. FRIEDMANN, MD, AND MICHELLE B. TARBOX, MD

Uncovering Shortcomings in Advertising Strategies for Over-The-Counter Minoxidil Products on Amazon

Introduction
The over-the-counter (OTC) market for hair loss products containing minoxidil has expanded in recent years. However, issues exist regarding the transparency, accuracy, and ethical nature of advertising strategies employed by companies selling these OTC treatments.
Methods
A Boolean search was conducted to identify popular OTC minoxidil solutions and serums sold on Amazon. Eight products were analyzed for safety information, adverse effects disclosures, and marketing claims.
Results
Only 25% of the products reported any safety information and none disclosed potential adverse effects, despite minoxidil's known side effects. Misleading efficacy claims were prevalent, often without supporting evidence. Non-FDA-approved ingredients were also misleadingly emphasized over minoxidil. Additionally, suspected manipulated before-and-after images propagated unrealistic expectations.
Conclusions
Significant concerns exist surrounding OTC minoxidil product advertising, including lack of transparency, inaccurate claims/images, omission of side effect data, and emotional persuasion techniques giving consumers unrealistic expectations. Greater transparency, scientific accuracy, ethical standards, and caution on the consumers' part are necessary when evaluating OTC hair loss products to empower informed decision-making. Further studies validating advertising methods are warranted.

BRADLEY KENT BGS; MARYAM NIAZI BSA; PAUL LIE MPH

Title: Evaluating the Differences in Intensive Care Unit Length of Stay: ReCell Autologous Therapy vs Autologous Split-Thickness Skin Grafts and NovoSorb Biodegradable Temporizing Matrix

Introduction:
This research study aims to contrast ReCell Autologous Therapy with conventional approaches involving autologous split-thickness skin grafting (STSG) and Biodegradable Temporizing Matrix (BTM) in individuals with burns encompassing 20% or more of their total body surface area (TBSA). The primary objective of the study is to evaluate differences in Intensive Care Unit (ICU) length of stay (LOS) among these patients.
Methods:
We conducted a retrospective analysis of electronic medical records for burn patients who underwent ReCell, STSG, or BTM treatment between January 1st, 2015, and July 31st, 2022, documenting each patient's ICU LOS. Data of ICU LOS was separated into groups of Recell and Non-recell patients.
Results:
An unpaired two-tailed independent T-test was evaluated between groups that have been administered Recell and Non-Recell treatments on the length of their average ICU stay, measured in days. T-test found significant differences between means of Recell and Non-Recell treatments ($p = 0.02777$, $\mu1 = 15.66$ $\mu2 = 7.2$). The Recell group is associated with significantly longer ICU stays than the Non-Recell group ($15.66 >> 7.2$, HSD).
Conclusion:
Our data indicates Recell patients had statistically significant increased LOS compared to non-Recell patients, an average of 15.66 days vs 7.2 days respectively. The previous literature review found that Recell technology tends to decrease the average length of hospital stays when compared to controls, but our clinical data appears to show differently. A possible confounder in this study is that patients who are put on the Recell regimen are likely patients with a higher burn area percentage or higher severity burns than those who are not given Recell, which would possibly explain the observed increase in the average length of ICU stay for the former group.

SACHI KHEMKA, MARYAM NIAZI, MOHAMMAD M. ANSARI, M.D.

Managing Non-ST-Elevation Myocardial Infarction in Diabetic Individuals: A Personalized Approach with Mechanical Aspiration Thrombectomy Performed Due to Significant Thrombus Formation and Clot Burden

INTRODUCTION
NSTEMI (Non-ST-Elevation Myocardial Infarction) is associated with rupture of a coronary plaque, leading to the formation of a blood clot that partially blocks blood flow. This results in damage to the myocardium, causing symptoms of chest pain, shortness of breath, and fatigue. Diabetes mellitus (DM) patients have an increased vulnerability to NSTEMI and experience a poorer prognosis, including higher rates of heart failure development and increased mortality compared to non-diabetic counterparts. Additionally, these patients are less likely to undergo percutaneous coronary intervention during hospitalization, emphasizing the significant impact of diabetes on the severity and outcomes of NSTEMI.
CASE PRESENTATION
Male age 66 with a PMH of DM and heavy smoking was transferred from an outside facility to the ED for further evaluation of severe chest pain and elevated troponins. He experienced multiple episodes of midsternal chest pain, associated with bilateral arm numbness and tingling. Troponin levels spiked from 64 to 209 and EKG revealed sinus bradycardia 57 bpm and no ST/T wave changes, suggestive of an NSTEMI diagnosis. Cardiac angiography showed the presence of 90% unstable eccentric stenosis in the LAD with the presence of significant clot (thrombus formation). Upon intervention, a mechanical aspiration thrombectomy was performed to remove initially proximal followed by distal embolism. Afterwhich, a drug eluting stent was deployed to the lesion with excellent results. Patient tolerated the procedure well with no complications.
CONCLUSION
This case gives insights into the effective use of mechanical aspiration thrombectomy and the importance of heightened vigilance in managing NSTEMIs with clot formation, especially in diabetic individuals. The positive outcomes observed in this patient emphasize the significance of a comprehensive approach to care, considering the unique challenges posed by comorbidities such as diabetes and a history of heavy smoking in the context of acute coronary syndrome with significant clot burden.

ASTHA KHIANI; CINDY HU; SHREYA UPPALA; MOHAMAD AL-RAHAWAN, MD

Evaluating the incidence of cardiotoxicity in pediatric patients treated with anthracyclines in the West Texas population through a retrospective chart review.

Introduction: Anthracyclines are commonly utilized in chemotherapy for various types of pediatric cancers. The association between anthracyclines and cardiotoxicity has been well-documented. However, this study would like to explore the data in a more rural environment. Studies show that the lack of research in rural areas makes it more difficult to improve the health of rural communities. Therefore, it would be beneficial to conduct a large-scale review to determine the incidence of cardiotoxicity after anthracycline administration in pediatric cancer patients. This study proposes to conduct a retrospective chart review with pediatric patients who received treatment with anthracyclines from January 1, 2018- January 1, 2023. The information provided from this investigation can help to understand the incidence of cardiotoxicity in pediatric cancer patients treated with anthracyclines in Lubbock County and surrounding rural West Texas counties. The study
aims to determine the incidence of cardiotoxicity among pediatric cancer patients treated with anthracyclines in order to evaluate the incidence of cardiotoxicity through changes in ejection fraction and shortening fraction among pediatric cancer patients.
Methods: Anonymous charts of pediatric oncology patients from University Medical Center (UMC) who received anthracyclines as a part of their treatment from January 1, 2018 –January 1, 2023.
Results: research and data collection ongoing
Conclusions: research and data collection ongoing

NATHANIEL KIMBALL, MBA; JOHN WOLPERT, MBA; MIA IVOS, MD; PRANAV SHARMA, MD

Case Report of Primary Malignant Melanoma Originating from the Urethra in Elderly Female Presenting with Urinary Retention

1. Introduction
Skin cancer is a relatively prevalent case across the world and is divided into melanoma and nonmelanoma. Primary urethral melanoma is incredibly rare. We present a case of malignant melanoma originating from the urethra in an elderly female whose primary symptom was urinary retention.
2. Case Report
68-year-old female presented to University Medical Center with a history of urinary retention. Imaging revealed a 3.5cm soft tissue mass was found within the vaginal cuff. Examination under anesthesia revealed a urethral mass of the proximal and distal urethra of unknown origin. Tissue biopsy of the mass showed a high-grade sarcoma, SOX10 positive. Further imaging studies showed multiple pulmonary nodules with increased metabolic rate. A second opinion was obtained from MD Anderson Cancer Center Department of Pathology, and their report demonstrated spindle cell malignancy involving squamous mucosa, possible melanoma in both the urethral and lung samples.
3.Discussion
Primary malignant melanoma typically occurs on the cutaneous tissues of the body; however, primary malignant melanoma of the urethra is an extremely rare occurrence. It represents less than 0.2% of all malignant melanomas in men and woman. Urethral bleeding, discharge, and tumor mass are all possible presentations of such malignant melanoma. The tumor is very aggressive; therefore, early detection and treatment are globally accepted as the most important factors to improve prognosis. Malignant melanoma has a poor prognosis despite surgical intervention, immunotherapy, and radiation therapy.
4. Conclusion
Primary malignant melanoma of the urethra is a very rare pathology. Due to non-specific symptoms and early invasion, it has a poor prognosis. Histological findings to support accurate and early diagnosis are crucial for improved prognosis.

SAAHITHI KOLLI, HATICE KURT M.D., STEPHANIE STROEVER PH.D., REGINA BARONIA M.D., WAIL AMOR M.D.

Gender-Based iCEB Variations in Acute Alcohol Intoxication

Introduction: Excessive alcohol intake can lead to cardiac arrhythmias, known as “holiday heart syndrome,” in otherwise healthy individuals. The index of cardio-electrophysiological balance (iCEB) detects such drug-induced arrhythmias by analyzing changes in wavelength on ECGs. While studies investigate iCEB changes with alcohol intoxication, limited research explores gender-based differences.
Methods: This study is a retrospective chart review of ER patients who visited UMC, Lubbock, TX between January 2018 and January 2022. iCEB was calculated as QT interval/QRS duration for ER patients with BAL>3.0 mg/dL and compared between genders using linear regression.
Results: Among the 48 acutely intoxicated (BAL>3.0 mg/dL) patients enrolled in the study, the mean age was 35.79 years, 54% were females, and 77% identified as Caucasian. The mean BAL for females was 178.54 mg/dL and for males was 192.05 mg/dL, with the difference between the two being statistically non-significant (p=0.71). Additionally, the mean iCEB was 3.67 for intoxicated males and 3.79 for intoxicated females, with a non-significant difference (p=0.318).
Conclusions: The non-significantly higher mean iCEB in females compared to males (p=0.318) suggest similar arrhythmia propensity in both genders with elevated BALs. Contrarily, prior studies indicate that women need lower alcohol doses for cardiovascular effects. Given the non-significant difference in the mean BALs of males and females (p=0.71), the modest sample size may have limited gender-based statistical significance in iCEB differences. Nevertheless, the similar iCEB values support interventions based on overall cardiovascular health rather than gender-specific considerations.

JENNIFER KRABACHER; LUCY YU; CAITLIN CHAPMAN; FIONA PRABHU, MD

Assessing Understanding of Strangulation with Intimate Partner Violence.

Introduction:
We evaluated the effectiveness of hosting an informational self-defense session focused on Intimate Partner Violence (IPV) and strangulation. After an initial assessment regarding knowledge of IPV during a Fitness Conference in 2023, we hosted a session for the TTUHSC community. We evaluated the session's effectiveness in improving understanding from the gaps in knowledge we assessed in the initial questionnaire, such as time till symptom onset after non-fatal strangulation.
Methods:
To start, we administered a short, 5-question assessment of participants' knowledge on the time till symptom onset. Next, we hosted a brief informational session regarding the medical concerns for IPV, and a 1-hr self-defense session to teach strategies for escaping threatening situations. Afterwards, we re-administered another assessment to participants to assess their learning.
Results:
From a pre-assessment with 10 TTUHSC SOM students, the following perception of symptom onset from strangulation is, on average: (1) loss of consciousness is 116.8 seconds, (2) short term memory loss is 190 seconds, and (3) permanent brain damage is 315.1 seconds. In contrast, the post-assessment showed the following perception of symptoms' average onset as follows: (1) loss of consciousness is 9 seconds, (2) short term memory loss is 15.5 seconds, and (3) permanent brain damage is 44.3 seconds.
Conclusions:
The education seminar was effective in improving participants' understanding on time till symptom onset to more closely resemble literature that found the following averages for symptom onset: (1) unconsciousness for an adult male is 6.8 seconds on average, and (2) anoxic brain injury is 14 seconds on average. Our results may be limited due to the medical language discrepancies of layman's terms understanding versus the medical definition of 'strangulation' being manual external structure compression. Armed with this knowledge, healthcare providers can continue to improve the understanding on the consequences of IPV.

KATHERINE LAKEY, BS; CAROLINE FINNEY, BA; KÖLL RADA, BS

Gynecologic Oncology Mortality Disparities Amidst Medicare Coverage Decline: A Regional Analysis

Introduction. Medicare coverage for Gynecologic Oncology procedures has declined in the U.S. with variations in the rate of decline based on cancer type and geographic region. The current study examines the relationship between Medicare coverage, geographic region, and year on the mortality rates of Cervical, Uterine, and Ovarian cancer between 2013- 2020. We predict that mortality rates for Cervical, Uterine, and Ovarian cancer will be highest in regions with the largest decline in average Medicare coverage.
Methods. The Centers of Medicare and Medicaid Services (CMS) database was used to quantify average Medicare coverage decline and identified regions with the largest decline. The CDC U.S. Cancer Statistics Data Visualization tool was utilized to collect the age-adjusted mortality rate by region for Cervical, Uterine, and Ovarian cancer. The relationship between mortality rates for these cancers was assessed in relation to coverage, region, and year.
Results. Average Medicare coverage, region, and year were all significant predictors of gynecologic cancer mortality rate with varying patterns based on type of cancer. Region was the strongest predictor for cervical cancer with the Southern region having the highest mortality rates. Uterine cancer showed a negative association between average Medicare coverage and mortality rates. Uterine cancer also showed the highest mortality rates in the Northeast region. Ovarian cancer was only predicted by year and was not significantly predicted by average Medicare coverage or region.
Conclusion. The data suggests geographic disparities in gynecologic oncology outcomes. Marked differences are shown between types of cancer which indicate independent variables impacting gynecologic mortality rates.

BENJAMIN LASOTA BS, TRISTIN CHAUDHURY MS, HANNAH CHAUDHURY BS, EMILY ROOK MS, VISHAL BANDARU MS, CHIP SHAW EDD, ALAN PANG MD, JOHN GRISWOLD MD

Exploring the Relationship between Patient Outcomes in a Burn Center and The Patient Room's Distance to the Nursing Station

Introduction
Patient management can be influenced by spatial distances from nursing stations. Some previous studies have demonstrated the significance of the spatial arrangement of the ward on workload, patient satisfaction, and architectural design. However, few studies have evaluated the relationship between the distance from the nursing station and the adverse event frequency, especially in cases of longer-term critical care such as the Burn Center Intensive Care Unit (BICU).
Methods
Patient information from the burn registry and the Electronic Medical Record was accessed for patients aged 18-89 who had been admitted to the Timothy J. Harnar Burn Center BICU at UMC between January 1, 2011 and March 1, 2022. Patients were excluded if they were not admitted to the BICU prior or charged rooms during their stay in the BICU. Patient outcomes, such as lab culture results, and demographic information were recorded and compared against the distance between the nursing station and the patient room.
Results
Eight patient rooms were evaluated for adverse events based on their distance to the nursing station. The patient rooms were lined symmetrically down two hallways with the nursing station at one end of the hallway. The distances were calculated from the nursing station and varied from 7 ft to 40 ft. The Pearson's correlation coefficient indicates a low correlation ($r=0.32$) between the room distance to the nursing station and the average number of microorganisms found in patient cultures.
Conclusions
The initial findings demonstrated a low correlation between negative patient outcomes, such as exposure to certain diseases, and distance from the nursing station to the patient room. Future analysis and studies should be conducted in larger wards to increase the range of distances and evaluate other aspects of patient outcomes.

ZIYANG LI, MS; KELSEY SPRINKLES; JEFF DENNIS, PHD; THERESA BYRD, DRPH

The Impact of an MPH degree on Medical Practice: A pilot study

Introduction: Getting an MPH degree is commonly a way physicians advance their medical career and has been increasing in popularity. To our knowledge, there is no literature investigating opinions about the MD(DO)/MPH degree. In this study, we plan to collect information from current doctors who earned an MPH degree about their usage of MPH knowledge, their thoughts on getting the degree, and improvements to the MPH curriculum. We believe this data could provide valuable guidance for future medical students and physicians.
Methods: Anonymous surveys were sent to physicians with an MPH degree at three medical schools in Texas and Arizona. Also, it was promoted through Twitter and within the APHA member society.
Results: A total of 54 responses were collected. Completing an MPH degree during medical school ranked as the top suggestion (44.5%) from participating physicians. Overall 62.9% of participating physicians use MPH knowledge every day, especially in epidemiology research (42.6%) and policy advocacy (40.7%); 90.7% of participants agreed that an MPH degree advanced their medical career. 66.7% of MD(DO)/MPHs served the urban areas. 51.9% of physicians highly recommend the MPH degree. Participating physicians spread over a broad spectrum of specialties.
Conclusion: Public health professionals serve a critical role in improving and maintaining health services among the general population. Based on the results of our study, we gained insight on how MPH knowledge provides value to physicians during their practice and the benefit of this degree for future medical students.

TANUJ MAHENDRU, BS; KEMBRA ALBRACHT-SCHULTE, PH.D.; TROY HOOPER, PT, LAT, ATC, PHD; CHRISTOPHER RIGGS, PT, DPT; CALEB PERRY, BS; TOBY BROOKS, LAT, ATC, PHD; JOHN NORBURY, MD

Impact of a Peer Led Outdoor Mens Workout Group on Health-Related Quality of Life and Factors Associated with Increased Consistency in Engaging in Physical Activity

Objectives:
Regular physical activity is crucial in the management of conditions treated by physiatrists, however consistency in a physical activity program can be challenging for individuals. This study explores if individuals who regularly participate in peer led mens' outdoor group fitness program (F3) have an increased health-related quality of life in comparison to controls.
Design:
Participants across the country were surveyed using a SF-36 survey. The study was conducted by enrolling men who participate in F3, and men not involved in the group. The questionnaire consisted of 19 questions to survey satisfaction with exercise habits. Parts of the survey are subjective by asking participants to assess their current health status, compared to their health last year.
Results:
A total of n=203 men were enrolled for this study. Initial descriptive statistics show a significant difference between the exercise group and the non-exercise group, with the exercise group having a lower BMI. Data suggested that benefits of peer led workouts included increased accountability, fellowship, and comradery. Several questions related to productivity at work and home showed statistical significance. The exercise group reported greater endurance with activities of daily living and community participation. Additional survey responses are being recruited to improve reliability of inferential statistics.
Conclusions:
This study showed a trend of improved health-related quality of life for men who work out in groups. Further research is needed to investigate the effect of group fitness, especially in a post-COVID era where evidence suggests that social isolation and physical inactivity continue to be risk factors for many conditions. Peer led workouts could be a new way to incorporate physical activity into the treatment plan for patients.

AKASH MAHESHWARI, MBA*; AAKASH KOTHARI, BS*; SUYASH SRIVASTAVA, BS; TANUJ MAHENDRU, BS; KENN FREEDMAN, MD, PHD

Vision Correction and Eye Examinations in West Texas College Students

Introduction: An increasing number of adolescents and young adults require corrective lenses, a trend that appears to be associated with increasing utilization of technology and higher amounts of screen time. In our study, we aimed to determine the answers to the following questions: are young adults (specifically college students) familiar with common descriptions of decreased visual acuity and does this population regularly receive eye examinations?
Methods: This project used the TTUHSC School of Medicine P3-1RecCenter Survey, an online survey instrument shared with college student participants at the Rec Center's TEXFIT conference and available for completion from March 4-6, 2023. The survey received a total of 22 responses. After data cleaning to include participants in the young adult age range of 18-30, 17 applicable responses were used to generate results. This project was approved for exempt review by the TTUHSC Institutional Review Board.
Results: According to the survey results, 52.9% of participants received an eye examination within the past year, 17.6% received an eye examination within the past two years, 23.5% received an eye examination longer than two years prior, and 5.9% never had an eye examination. 41.2% of respondents required corrective lenses to see clearly. 35.3% of respondents correctly identified the definition of refractive error, 29.4% correctly identified the definition of myopia (nearsightedness), 17.6% correctly identified the definition of hyperopia (farsightedness), and 35.3% correctly identified the definition of astigmatism.
Conclusions: Although many of our respondents had an eye exam within the past year and required corrective lenses, few were aware of common terms related to vision correction. It is important that physicians strive to educate the general population about common medical terms so that individuals can play an active role in the management of their own health. Population-based studies and subsequent educational interventions are impactful ways to improve health literacy.

AVANTIKA MALLIK M.S, (TEXAS TECH UNIVERSITY HEALTH SCIENCE CENTER SCHOOL OF MEDICINE), CHRISTOPHER WILLIAMS, M.D., PH.D. YASH CHOKSI, M.D., CODY KEATING, M.S., SARAH SHORT, PH.D., JOSHUA THOMPSON. B.S.

BVES Modulates E-cadherin Levels in the Epithelium

Objective: Blood Vessel Epicardial Substance, or BVES, has an integral role in maintaining cell-cell junction integrity within colonic epithelial. Loss of BVES in IBD and colorectal cancer suggests that other junctional proteins such as E-cadherin may coexist with BVES and contribute to loss of cell-cell junctional integrity in colorectal diseases. We hypothesize that the effect BVES has on cell migration may be due to E-cadherin.
Approach: A mechanical injury model was used to make intestinal wounds in mice using a laryngoscope in BVES knockout mice and control mice. A calcium switching experiment was performed using EGTA, a calcium-specific metal chelator, to interfere with cell junctions and looking at phenotypic changes when adding the calcium back to both BVES knockdown and control CaCO2 cells. Immunofluorescent cell staining was performed to stain CaCO2 cells with E-cadherin. Confocal imaging was performed using a Nikon FN1 light microscope to look at the stained cells. Subcellular fractionations were done using a Subcellular Protein Fractionation Kit for Cultured Cells by Thermofisher Catalog number: 78840. Immunoblots were done by initially performing a transient transfection of flag-BVES in CaCO2 cells. The immunoblot used FLAG, and E-Cadherin, and GAPDH antibodies.
Results: BVES knockout mice had delayed healing time in comparison to the control mice and the BVES knockdown cells had delayed re-formation of adherens junctions after calcium switch assay in comparison to control CaCO2 cells. Immunoflourencent staining and cell fractionation both show a reduction and/or displacement of E-cadherin with significantly less E-Cadherin in the membrane and cytoplasm in BVES knockdown CaCO2 cells compared to BVES control CaCO2 cells. The immunblot shows that there is reduced E-cadherin expression as well as changes in localization.
Conclusion: A loss of BVES in CaCO2 cells may cause a displacement of E-cadherin, therefore we conclude that BVES modulates cellular E-cadherin levels, and this may effect cellular phenotypes.

KYLE MANGUM, B.S.; TAYLOR BLACKWOOD, D.O.; JUSTIN HARDER, B.S.; BRENDAN MACKAY, M.D

Open Reduction and Internal Fixation of a Radius and Ulna Fracture in a Patient with an Elbow Arthrodesis: A Case Report

Introduction: Elbow Arthrodesis (EA) is a seldomly utilized procedure reserved for last resort treatment of difficult elbow pathology. Since EA is typically used only after other treatment modalities have failed, cases tend to be complex, with many comorbidities and complications as common as 23-43%. Due to its infrequent use, literature addressing complications associated with EA is sparse. In this case report, we present a novel approach to address a midshaft fracture of the ulna and radius in a medically complex patient with a previous EA utilizing a Titanium Elastic Nail System (TENS).
Results: The use of the TENS resulted in a successful, minimally invasive open reduction and internal fixation (ORIF) of the forearm fracture requiring little modification of the previous EA. Incision sites were clear of infection at the 2-week follow-up. Abundant callus formations about the fracture site and stable hardware were observed at the seven-week follow-up. The hardware was removed 16 weeks following placement with intraoperative stress radiographs demonstrating no motion and complete healing.
Conclusion: The use of a TENS to achieve ORIF of a forearm fracture is a promising, minimally invasive treatment for patients with an EA and a complex medical history.

CAITLYN MATEJKA MS, STEPHANIE STROEVER PHD, KENDRA SCHNEIDER, ROBYN RICHMOND MD, MILOS BUHAVAC MD

Whole Blood vs Blood Component Therapy: Who's the Real Winner?

Introduction:
Mass transfusion protocol (MTP) is a life-saving intervention for patients suffering from acute blood loss.1 Blood components are administered equally but can be administered individually based on patient needs. Blood component therapy (BCT) is expensive compared to whole blood (WB). Both transfusion therapies are used in MTP dependent on patient needs and protocols.
Hypothesis:
We hypothesize that WB transfusion will decrease transfusion costs and provide similar outcomes in comparison to BCT.
Methods:
This is a retrospective single center chart review conducted at University Medical Center. Patients aged 18 to 89 requiring MTP between March 1st, 2021, and December 31st, 2022, were included in the study. Statistical analysis was conducted using an independent t test and Wilcoxon rank-sum test to analyze differences between treatment groups. Simple linear regression was used to determine the effect of total cost on treatment groups. Poisson regression was used to determine the effect of total blood units transfused and length of stay in hospital on treatment groups.
Results:
After controlling for several factors, a significant difference was observed in the total cost of blood between BCT only and BCT plus WB groups ($p = 0.003$). Individuals who received both whole blood and BCT had increased costs of $1758.76. Additionally, differences were noted in total blood units transfused between the BCT only and BCT plus WB groups ($p = 0.000$).
Conclusions:
In conclusion, increased cost was observed in individuals who received WB therapy versus the BCT only group. Due to its retrospective nature limitations of this study include lack of data regarding how hemorrhage control was achieved and prehospital hemorrhage time. Future directions include performance of a prospective study to assess transfusion and cost benefit.

MERRY MATHEW, B.S.; SACHI KHEMKA, B.S. MBA; DELANEY JENSCHKE, B.S.; MUNEEZA SHEIKH, B.S.; DR. BETSY JONES, EDD

Examining Gender-Based Disparities in West Texas Medical Students' Specialty Preferences and Family Planning Attitudes

Introduction:
Gender-based disparities in medical education and career choices are a growing concern as men and women have different preferences. Notably, there is a lack of studies on gender-based disparities in medical students' consideration of family planning and reproductive healthcare in specialty choices.
Methods:
This study examines gender-based differences in preferences towards specialties and family planning and its impact on medical education and career choices in Lubbock, Texas. Data was collected through survey responses to 9 distinct questions. The survey sample included 90 male and 82 female respondents.
Results:
Both male and female medical students express moderate interest in primary care. Male students show a higher inclination toward medical subspecialties, while female students exhibit lower interest in this area. Females are generally less inclined to consider having a child during medical school, while males are more open to family planning during residency. Females anticipate more training interruptions due to family planning in medical school, and both males and females express low concern about the impact of reproductive health policies on specialty choices. Notably, females tend to consider family planning more influential in their specialty choice compared to males.
Conclusion:
In conclusion, the analysis of medical students' interests and family planning attitudes highlights notable differences between male and female students. These findings underscore the need for targeted support and policies in medical schools to address gender-specific concerns and preferences.

GRACE MCCREA BSA, SARAH NEAL HORNE MPH, MPA, ALAN PANG M.D., JOHN GARZA PH.D., REBECCA GABRILSKA BS, JOHN GRISWOLD M.D.

Hemodynamic Instability in Burn Patients Exacerbated by Alcohol Abuse

Introduction
Burn shock involves a combination of circulatory and microcirculatory system impairment and is accompanied by a decrease in cardiac output and reduced peripheral blood flow. Initially, burns cause massive edema and hypovolemia due to an increased capillary permeability which can be managed with aggressive fluid resuscitation to restore volume status. Patients with liver cirrhosis, a complication commonly seen in patients with excessive alcohol use (EAU), have a hyperdynamic circulatory syndrome characterized by low systemic vascular resistance which presents with arterial hypotension. Our objective is to determine if burn patients who have a history of EAU and subsequent liver damage are at risk of arterial hypotension and ultimately burn shock.
Methods
A group of 613 Burn Intensive Care Unit (BICU) patients were retrospectively identified who met inclusion criteria using the University Medical Center's patient database from 2021-2023. Analyses include dividing patients into two groups and then comparing all other variables using the permutational unequal variance t-test for continuous variables or Fisher's test for binary variables.
Results:
Overall, EAU+ had lower admission MAP [95.89(19.02) vs 102.12 (18.39), SMD = 0.3376, p = 0.015]. Mean admission MAP remained lower for EAU+ when considering only patients with TBSA < 20%, however the difference was not statistically significant [99.15 (16.97) vs 102.97 (17.96), SMD = 0.2138, p = 0.1260]. Similarly, mean admission MAP was lower for EAU+ when considering patients with TBSA > 20%, with the difference not statistically significant [80.18 (21.28) vs 90.95 (21.14), SMD = 0.5088, p = 0.1488].
Conclusion:
The results show that admission MAP is significantly lower in EAU+ patients, while separating these patients based on TBSA burn percentage yielded insignificant results. More research is warranted to elucidate the impact that excessive alcohol use has on admission MAP in burn patients.

VIRGINIA MCGRATH; REBECCA GABRILSKA; DR. JOHN GRISWOLD; DR. ALAN PANG

Normal Saline versus Lactated Ringer's in Epinephrine Solution: Impact on Hemostasis in Burn Patients

Introduction
Due to the nature of the wounds, the necessity of debridement, and the harvesting of skin grafts, a major concern with burn patients is the management of bleeding while replacing lost fluids. Traditionally, transfusions to maintain blood pressure and encourage fluid retention have been a combination of normal saline (NS) with epinephrine. However, alternative fluid-replacement solutions, such as Lactated Ringer's (LR), contain additional components (potassium, calcium, and lactate) at a lower osmolarity and higher pH than NS and may provide further hemostatic benefits. Calcium specifically as it is a key factor in the coagulation cascade with its role in platelet activation and platelet plug formation. This study aims to assess the hemostatic differences between topical applications of NS with epinephrine and LR with epinephrine during burn surgery.
Methods
Retrospective data was collected via the EMR system. Patient charts were divided into two groups of 60: normal saline with 0.1% epinephrine and Lactated Ringer's with 0.1% epinephrine.
Data will be summarized using descriptive statistics. Variables with non-zero variance will be used to determine statistical significance. Fisher's exact test or chi-squared test will be used to determine dependence between categorical variables. Normality will be calculated using the Shapiro-Wilk test. Parametric (Welch's t-test) or nonparametric (Wilcoxon test) will be used to determine significance of continuous variables. Significance will be set at $p<0.05$. Analysis will be performed using R version 4.0.2.
Results
No statistically significant difference was found within the measures of hemostasis between patients who received topical applications of normal saline with epinephrine and those who received Lactated Ringer's with epinephrine during burn surgery.
Conclusions
The topical application of either normal saline or Lactated Ringer's during burn surgery will benefit the patient's hemostatic status. Therefore, other considerations such as cost and availability can be considered without having a deleterious effect on the patient.

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Cubital Tunnel Syndrome in Time to Presentation and Outcomes in West Texas: Socioeconomic Differences

Intro:
Cubital Tunnel Syndrome (CuTS) is a nerve compression syndrome and is the second most diagnosed mononeuropathy. It occurs when the ulnar nerve is compressed in the cubital tunnel near the elbow. Symptoms include numbness, tingling, and pain in the ring and small finger and the ulnar aspect of the hand. CuTS occurs due to overuse and repetitive extension and there are a variety of other risk factors. CuTS is believed to be underdiagnosed because patients often avoid seeking out treatment for their symptoms (1).
The socioeconomic status of patients has been found to be a contributing factor for patient access to healthcare. In one study, they found that patients who were receiving a non-emergency coronary revascularization procedure had a great difference in waiting times amongst different socioeconomic statuses. The statistics showed that there was a 35% difference, or 43 days, between the lowest socioeconomic tier to the highest socioeconomic tier (2).
Methods:
We will utilize the Electronic Medical Record to look up pertinent data on our patients. This includes, but is not limited to demographics, substance use, days between cubital tunnel diagnosis and surgery, pain level, pain management, comorbidities, and discharge disposition. We will use the Health Resources and Services Administration's tool to determine if the zipcode the patient provided is in an underserved area.
https://data.hrsa.gov/tools/shortage-area/by-address
Results:
Data collection is ongoing.
Conclusion:
This study seeks to determine if there is a difference in the socioeconomic status and the time interval between initial presentation of cubital tunnel syndrome and cubital tunnel surgery. Through this we hope to identify whether socioeconomics is a social determinant of seeking treatment for CuTS.
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2. Moscelli, G., Siciliani, L., Gutacker, N., & Cookson, R. (2018). Socioeconomic inequality of access to healthcare: Does choice explain the gradient? Journal of Health Economics, 57, 290314.

ERIN MILLICAN; ELOISE D'HAITI; DR. DAN WEBSTER, PHD

The Cadaver Companions: Podcasting to Increase Mental Coping Skills amongst First Year Medical Students

Introduction: Anatomy is one of the first classes most medical students take at the beginning of medical school. Most students find the transition difficult, learning how to find study resources, create a balanced study schedule, and thoroughly review for exams. We then developed a podcast, which was given to students before the start of the anatomy block, to determine the efficacy of podcasting in helping medical students develop coping skills for anatomy.
Methods: A survey was given to first year medical students who had already gone through anatomy. The survey mainly concerned questions that tried to see which podcast topics would be most useful, the prevalence of podcast listeners in medical school, and if medical students would've preferred having a podcast their first time through medical school. Podcast recording was done with former graduate medical education students as well as professors. Analytics from Spotify gave detailed information about listening patterns and audiences. After completion of the podcast, another survey was given which centered around the efficacy of the podcast in aiding students in developing coping skills for anatomy.
Results: The podcast had 292 plays across its 6 episodes and an audience size of 118. Episode retention was high across most episodes, with more than 50% of listeners playing the episode in its entirety. 72.7% of MS1 students said they would recommend the podcast to someone else. Feedback from MS1 students consistently said that the podcast helped alleviate anxiety about the anatomy course. It also included that they wanted more but shorter episodes, more communication about when episodes are released, and releasing the podcast earlier so that they could listen before orientation.
Conclusions: Podcasts are an accessible and well-used format to share information and help first year medical students develop coping skills for anatomy.

JYNTRE MILLSAP, BS; JAD ZEITOUNI, BS; WOOYOUNG JANG, BS; YUSUF DUNDAR, MD

Establishment of a Virtual Head and Neck Cancer Screening Program at a Free Primary Healthcare Clinic for Uninsured Populations

Introduction
Head and neck cancer (HNC) screening is not generally performed in primary care visits. Access to healthcare is limited to patients who are uninsured and/or live in an underserved area and is more pronounced for those seeking access to specialty care, such as Otolaryngology. As a result, patients in these underserved areas are unable to access adequate screenings that can identify HNC early on in its course. We set out to develop and implement a HNC screening program at a free primary healthcare clinic serving uninsured patients in our area.
Methods
HIPAA-compliant online screening questionnaires were conducted by volunteer medical students at the local free primary healthcare clinic. Screening participation is optional for clinic patients and any concerning physical exam findings, such as visible lesions and masses, were documented and referred immediately to an otolaryngologist. Questionnaire results were reviewed by a fellowship trained HNC surgeon. All patients deemed high-risk by the surgeon were referred to the ENT clinic for further workup. Intermediate-risk and low-risk patients were advised to continue follow-up with their primary care provider, as well as directed to inform screening staff of new symptom development.
Results
We have been able to screen 59 patients over the past 6 months, identifying 3 high risk individuals, 19 intermediate risk individuals, and 37 low risk individuals. The program is ongoing, and patients have continual access to the screening program when visiting the free primary care clinic.
Conclusions
Our screening model has allowed us to provide consistent and accessible HNC screening to the most underserved populations in our city. The virtual and adaptable nature of this screening program allows it to be implemented and accessed by the most remote and underserved populations. It provides a roadmap to better address the disparities that underserved and rural populations face in accessing HNC screenings.

BEN MITCHELL; KATHERINE LAKEY; KAITLAND DUNHAM; KRISTIN HUSEMAN; PEYTON PRESTO; DR. ALAN PANG, MD; DR. KAMERON ROGERS, MD

Rural vs. Urban Disparities in Pediatric Diabetic Ketoacidosis: A Retrospective Case-Control Study Comparing Transfer-times to Presentation and Outcomes of DKA

Introduction: Diabetic ketoacidosis (DKA) is a challenging condition to manage, and pediatric patients in rural areas face significant health disparities that increase the risk of poor outcomes. We aimed to assess the disparities affecting pediatric patients with DKA among those coming from more “rural” and “urban” populations and compared health outcomes.
Methods: This is an ongoing retrospective review using electronic health records of all pediatric patients admitted to University Medical Center (UMC) Children’s Hospital Pediatric Intensive Care Unit (PICU) with DKA January 2021 – December 2022. Patients 1-18 years with diagnosed DKA were included. Patients were stratified by rural/urban distinctions based on zipcodes and transfers, and fisher’s test and t test were used to assess health outcomes, such as length of stay, time to anion gap closure, and time to readmission.
Results: Of the 65 patients assessed so far, 21 patients are designated rural and 44 designated urbans. Rural patients currently trend with a longer length of stay of 33.18 hours as compared to 31.95 hours in the urban population (SMD 0.0520 | p=0.477). Current statistics are being run to increase the population pool of the study, include the variable of transfer times, and look at other health outcomes, time of anion gap closure and insulin drip. Conclusions: Once pediatric DKA patients reach the PICU at UMC, there is currently not a significance shown between length of stay and rural/urban distinction, indicating a balanced outcome once obtaining tertiary pediatric subspecialty care despite rural/urban designation. This lack of significance could be due to adequate treatment in transit to Lubbock and/or confounding factors like parental health literacy and adolescent forgetfulness in medication.

MEGAN MURCHISON MS, MBA; CAROLINE CAMPBELL, BSA; ADDIE PEDERSON, BA; HAFSA ZUBERI, BS; CHELSEY KRAMBEER, MD; CAMERON CLARKE, MD; MATT PORTER, MD

Residents Perceptions of Minimally Invasive Glaucoma Surgery

Currently, ACGME does not have a minimal requirement for microinvasive glaucoma surgery (MIGS) training for ophthalmology residency programs. With varied training across programs, this study aims to better understand perceived competence of ophthalmology residents in MIGS procedures.
A novel 12-question Qualtrics survey was sent to PGY-4 ophthalmology residents across the United States. A total of 83 responses from 23 states were recorded for graduating PGY-4 ophthalmology residents during a 3-year timespan from 2020-2023.
The majority of programs sampled incorporate MIGS into their curriculum, but only 7.04% of graduating ophthalmology residents feel extremely confident in performing MIGS in future practice. When asking residents how satisfied they are with glaucoma training within their residency program, the only category residents did not feel at all satisfied with is surgical skills. While 73.61% of PGY-4 residents plan on incorporating MIGS in their future practice, 56.61% of these individuals felt that they need more training. The top two reported barriers that limited resident exposure to MIGS were insufficient faculty training and number of surgical cases. When asked what area of ophthalmology residents planned on entering after graduation, 31.94% responded with private comprehensive ophthalmology and 26.39% with glaucoma.
There has been increasing interest in glaucoma procedures by comprehensive ophthalmologists. With glaucoma being the leading cause of irreversible blindness, standardized MIGS training during residency is essential to expand access and improve patient care.

AMBER NANNI; CARL PELLERIN, MD; COBY RAY, MD, MS, MBA

A Unique Pediatric Case of Miller Fisher Syndrome

This case report explores a distinctive presentation of Miller Fisher syndrome (MFS) in a 6-year-old male, elucidating the clinical nuances, diagnostic approach, and therapeutic management of this rare autoimmune-mediated peripheral neuropathy. The patient exhibited acute-onset right facial weakness, asymmetric bilateral upper and lower extremity abnormalities, areflexia, and ataxia, accompanied by diplopia exacerbated during lateral gaze, gastrointestinal upset, and various systemic symptoms. Notably, the child had a recent history of oral herpes treated with acyclovir.
A comprehensive examination revealed bilateral abduction limitations and a right-sided cranial nerve palsy, presenting with exposure keratopathy. Diagnostic investigations included neurological assessments, ophthalmic evaluations, and relevant laboratory tests to confirm the diagnosis of MFS.
The case underscores the importance of recognizing MFS as a rare variant of Guillain-Barré Syndrome (GBS) in pediatric patients presenting with acute neurological and ophthalmic symptoms. The report provides valuable insights into the clinical manifestation and diagnostic considerations, emphasizing the need for a thorough evaluation in pediatric cases.
This case contributes to the existing literature by highlighting the distinctive features of MFS in children, emphasizing the necessity of considering this rare variant in the differential diagnosis of pediatric patients with acute neurological symptoms. Timely recognition and intervention are crucial for optimal outcomes, and increased awareness among healthcare professionals is essential for accurate diagnosis and management of this uncommon autoimmune disorder in the pediatric population.

MARYAM NIAZI; CORLEY PRUNEDA M.D.; KRISTINA BLEGEN D.O.; MICHELLE TARBOX, M.D.

Cutaneous Manifestations of Dialysis Associated Steal Syndrome in a Patient with Chronic Kidney Disease

Introduction
Dialysis Associated Steal Syndrome (DASS) is a rare complication of arteriovenous fistulae (AVF) for hemodialysis, characterized by diversion of arterial blood flow and hypoperfusion of tissues distal to the AVF. It may present with cutaneous ulcers, hypoxia-induced limb pain, gangrene, and nail changes. Here we discuss a patient with skin and nail changes secondary to DASS, highlighting a non-surgical treatment for high-risk patients.
Case Presentation
A 47-year-old immunosuppressed female with a kidney transplant due to ESRD from diabetes mellitus, and an AVF on the right arm, presented with a painful skin lesion of the right finger. Exam showed a 6mm papule with central keratotic plug on the dorsal right fourth digit and a dystrophic fourth fingernail. The lesion was diagnosed as acquired perforating collagenosis (APC), confirmed with skin biopsy. A nail clipping was negative for fungus. Two months later, she experienced worsening pain and edema of the digit. The skin biopsy site had not healed and there was subungual pus of the dystrophic fingernail, with culture growing pseudomonas aeruginosa treated with ciprofloxacin. Angiogram showed reduced blood flow to the distal extremity secondary to DASS. Daily hyperbaric oxygen therapy led to improved blood flow with subsequent healing of her skin lesion.
Conclusion
DASS requires prompt treatment to revascularize the affected extremity to avoid progressive ischemia. While this classically involves surgical ligation of the AVF, our patient was considered high risk for surgery so hyperbaric oxygen therapy was chosen as a less invasive initial treatment. It is important for clinicians to be familiar with dermatologic manifestations in CKD patients, especially those with AVF. Prompt recognition and treatment of DASS can be potentially limb- and life-saving.

ELLIOTT NORMAN, ABU MINHAJUDDIN, APRIL GORMAN, MARSHALL SMITH, ANUTHTHARA LOKUBANDARA, VICTORIA JOHNSON, REGINA BARONIA, SARAH WAKEFIELD

Association between Depressive Symptoms, Anxiety, and Functioning in School in Children with a History of Trauma

Introduction: This study aimed to investigate whether a history of trauma in children moderates the effects of anxiety and depression on school functioning as well as to investigate the moderating effects of the number of traumatic events and the type of trauma (interpersonal vs. non-interpersonal) on the relationship between depression, anxiety, and school functioning in children and adolescents.
Methods: A total of 567 participants from all 12 nodes of the Texas Youth Depression and Suicide Risk Network (TX-YDSRN) were assessed using the GAD-7 questionnaire for anxiety, PHQ-9 for depressive symptoms, TESI-C for history of trauma, and SAS-SR for school functioning.
Results: Results revealed that anxiety and depression were positively correlated with decreased school functioning. However, a history of trauma had no moderating effect on the correlation between anxiety, depression, and school functioning. A negative relationship was found between depression and decreased school functioning for participants with one traumatic event, those with 2-3 traumatic events, and those who experienced non-interpersonal trauma. A negative relationship was also found between anxiety and decreased school functioning for participants with one traumatic event.
Conclusion: The study suggests that children may develop coping mechanisms and resilience factors that help them adapt to the effects of trauma, which can influence how trauma affects school functioning. Additionally, the presence of protective factors, such as social support, positive relationships, and a stable home environment, can help mitigate the effects of trauma on school functioning. Future steps include classifying trauma to see if threatened vs. experienced trauma makes a difference. Further research is needed to explore these factors and their potential influence on the relationship between anxiety, depression, and school functioning in children with a history of trauma.

JACQUI OROPEZA BS; DR. PATRICK REYNOLDS M.D. PH. D.

Investigating the GD2 Pathway in Neuroblastoma Cell Lines

Introduction
Neuroblastoma is a rare form of cancer, predominantly afflicting children. Neuroblastomas express a distinctive disialoganglioside, GD2, serving as a potential target in cancer therapies. However, not all neuroblastomas display high or any expression of GD2. My research investigated the different expression levels of enzymes within the GD2 synthesis pathway compared to the surface expression of GD2 across multiple neuroblastoma cell lines. Discerning the specific enzymes responsible for low GD2 expression in certain neuroblastoma cell lines opens avenues for potential therapeutic interventions through targeted manipulation of these enzymes.
Methods
I grew cultures of the following established cancer cell lines: CHLA-70, CHLA-90, CHLA-247, SMS-KCN, SMS-KAN, SMS-KCNR, SK-N-FI, COG-N–453, COG-N-515, and COG-N-534.
I grew cell cultures, performed GD2 flow cytometry analysis, made pellets, and performed qPCR.
Results
CHLA-70, CHLA-90, or SK-N-FI were found to have low GD2 expression. The three cell lines had varying expressions of upstream and downstream enzymes (GD2 synthase, GD3 synthase, GD1b synthase, GM3 synthase, and Neu3 synthase).
Conclusions
The decreased GD2 expression of CHLA-70, CHLA-90, or SK-N-FI was thought to be due to either a known enzyme upstream or downstream in the pathways, causing a decrease in GD2 expression. Alternatively, in the instance where all enzymes had normal expression within the cell, it suggests a novel protein adversely affecting the pathway. The varied enzyme expression observed across the GD2 low cell lines suggests diverse underlying factors contributing to the diminished GD2 levels, thereby elucidating multiple potential avenues for targeted intervention. A comprehensive analysis of additional cell lines is imperative to unveil discernible patterns before substantive conclusions can be drawn.

KY PASCHALL; HARRISON WOODS; KEELY HOBART MD

Student Led Summer-Research Project to increase utilization of SGLT-2 Inhibitors

Introduction: Sodium-glucose co-transporter 2 inhibitors (SGLT2i) improve glycemic control and provide cardiovascular (CV)-benefits in patients with type 2 diabetes mellitus (T2DM). The American Diabetes Association recommends a CV-protective SGLT2i to reduce the risk of CV complications and death in patients with T2DM and cardiovascular disease (CVD). However, there are several well-documented barriers to SGLT2i use, including high medication cost and inadequate insurance coverage, which may cause providers to underutilize them. We launched a student-led quality improvement (QI) project to help increase the utilization of SGLT2i amongst family medicine patients with T2DM and CVD. Our objective is to increase SGLT2i use by 10% amongst our target patient population.
Methods: We performed a retrospective chart review to determine a baseline SGLT2i utilization rate amongst FM patients with T2DM and CVD. Inclusion criteria were T2DM, established atherosclerotic CVD and/or HF, and a glomerular filtration rate ≥30 mL/min/1.73m2 within the past year.
Results: Baseline chart review showed that out of 450 eligible patients, only 91 (20.2%) were taking an SGLT2i. We delivered lectures to providers emphasizing the CV-benefits of SGLT2i therapy, resources patients can access to attenuate medication costs, and new guidelines that permit SGLT2i use for CV-protection in patients with kidney disease. A “provider guide to SGLT2i use in patients with T2DM and CVD” was created and made available in clinic. The guide explains when an SGLT2i can be employed for CV-protection and provides a step-by-step flow chart to help providers connect patients to financial assistance programs.
Conclusion: Evaluation of SGLT2i utilization after the first QI cycle demonstrated that our initial interventions failed to reach our project goal. Additional interventions are currently being implemented for a second QI cycle. We have also begun working on an additional project which will evaluate clinical and nonclinical variables associated with utilization of cardioprotective antihyperglycemic agents.

SHRUTI PATEL, MBA; SUYASH JAIN, MBA; RASHID ALI, MD; KENNETH NUGENT, MD

Mechanisms of Dyspnea in Parkinson's Disease: A Literature Review

Background: Dyspnea is an important non-motor symptom in Parkinson's disease (PD) that impacts quality of life. The mechanisms underlying dyspnea have been difficult to distinguish due to challenges separating central respiratory control abnormalities from peripheral respiratory muscle dysfunction and chest wall rigidity.
Methods: A comprehensive literature review was conducted, searching the PubMed database for observational studies on respiratory dysfunction and dyspnea in PD. Inclusion criteria were studies with PD patients without other neurological disorders. Case studies were excluded. Data on study size, disease duration, control groups, and respiratory defects were extracted.
Results: The search yielded 21 unique publications on pulmonary function in PD. Key findings were: 1) restrictive defects are common, with prevalence up to 85% in some studies; 2) effects of levodopa on pulmonary function are variable across studies; 3) there is limited research on the role of central respiratory centers in dyspnea pathophysiology in PD. Proposed mechanisms include: direct involvement of brainstem respiratory structures, loss of dopamine input to these regions, and astrocyte dysfunction affecting respiratory rhythm generation.
Conclusion: This review outlines potential mechanisms underlying dyspnea in PD, including central respiratory dysfunction, peripheral muscle/chest wall abnormalities, impaired respiratory sensation, and medication effects. More research is needed investigating specific brainstem regions involved, chemoreceptor pathology, correlations between respiratory load and perceived dyspnea, and medication impacts on pulmonary function.

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Cubital Tunnel Syndrome in Time to Presentation and Outcomes in West Texas: Ethnic Group Differences

Introduction:
Cubital Tunnel Syndrome (CuTS) is a nerve compression syndrome and is the second most diagnosed mononeuropathy. It occurs when the ulnar nerve is compressed in the cubital tunnel near the elbow. CuTS occurs due to overuse and repetitive extension and there are a variety of other risk factors. CuTS is believed to be underdiagnosed because patients often avoid seeking out treatment for their symptoms (1).
Health disparities are common among a variety of races and ethnic groups in comparison to the white population. The contributing factors to this stem from many root causes, such as discrimination that have led to inequalities in socioeconomic position, health insurance status, and environmental and occupational exposures (2). Another factor being cultural and psychosocial that determines the likeliness of a patient to reach out to a healthcare provider for health. Another study found that 20 percent of Latinos and 16 percent of African Americans felt like they were judged and treated unfairly compared to the 9 percent of whites. These statistics show the inequality amongst a couple of races and ethnic groups (3).
Methods:
We will utilize the Electronic Medical Record to look up pertinent data on our patients. This includes, but is not limited to: demographics, substance use, days between cubital tunnel diagnosis and surgery, pain level, pain management, comorbidities, and discharge disposition. We will use the Health Resources and Services Administration's tool to determine if the zipcode the patient provided is in an underserved area.
https://data.hrsa.gov/tools/shortage-area/by-address
Results:
Data collection is ongoing.
Conclusion:
This study seeks to determine if there is a difference in ethnicity and the time interval between initial presentation of cubital tunnel syndrome and cubital tunnel surgery. Through this we hope to identify whether ethnicity is a social determinant of seeking treatment for CuTS.

GRACE PURCELL; KATHERINE LAKEY; CAITLIN TAYAG; CAROLINE PRESSON; GABRIELLA SMALLIGAN; ELLIOTTE CANNON

Women's Health Education: An Evaluation of Public Health Intervention in College Women

Introduction: Our team performed a needs assessment for gaps in women's health knowledge by surveying Texas Tech Recreation Center attendants in Spring 2023. Results show a lack of knowledge on UTI prevention and treatment, STI testing, birth control methods, and locations to access routine gynecologic care. A public health intervention was developed to improve identified gaps in knowledge. The current study aims to evaluate the success of the women's health intervention conducted.
Method: Our team went to a sorority chapter meeting in-person on Sept 24, 2023 to present women's health information via powerpoint. A pre- and post-survey was collected via QR code with 114 pre-survery and 55 post-survey responses recorded. Descriptive statistics were performed to show improvement in scores.
Results: Following our intervention, we identified an increase in the population's ability to recognize UTI symptoms and how to prevent/treat symptoms. We also found that the students learned more about where to get STI tested in Lubbock. We also identified an increase in familiarity with reproductive pathology, specifically endometriosis, uterine fibroids, and pelvic inflammatory disease.
Conclusion: We identified an overall increase in our study population's knowledge on women's health topics following our intervention. This suggests that the developed public health intervention was effective at improving the identified gaps in knowledge in the population.

ANDRES RIOS, BS; PAIGE LIVINGSTON LOPEZ, BA BS; BENJAMIN OLIVO, BS; DR. JOHN GRISWOLD, MD; DR. ALAN PANG, MD

Relationship of Patient Height on Expected Length of Stay in Burn Patients: a retrospective study.

Severe burn injuries cover≥ 20% of a patient's total body surface area (TBSA). For these burn patients, proper planning of care is critical for effective treatment, especially in burn trauma centers with a higher influx of burn patients. Effective utilization of prediction models is paramount for medical teams involved in burn trauma care. In recent years improvements in the field of burn medicine have improved both mortality and hospital length of stay (LOS). The change in LOS has made use of classical models for predicting patient outcomes and length of stay not as reliable as it once was. For this reason, revision of the LOS prediction models and variables influencing them is required. We believe there is a negative correlation between a patient's height and their hospital LOS. This study of LOS variables will help produce better prediction models with the end goal of improving hospital planning for resource allocation for resource-intensive illnesses such as burns. Using the Electronic Health Record to obtain charts of burn patients from October 1, 2012, to October 1, 2022, we will categorize burn patients based on height, age, number of surgeries, healthcare complications, and % TBSA and test the hypothesis that there is a negative correlation between height and length of stay in patients with comparable % TBSA.

JAYLYN ROBINSON; ABDUL QAHAR KHAN YASINZAI; BISMA TAREEN; BINA ASIF; AGHA WALI; DR. ASAD ULLAH, MD

Comparing Neoadjuvant and Adjuvant Radiation Therapy Outcomes in Rectosigmoid Junction Cancer

Background: This research aims to examine the significance of neoadjuvant radiation therapy versus adjuvant radiation in rectosigmoid junction cancer (RSJC) as well as to identify prognostic factors associated with poor outcomes in this population. This study will provide further clarification in the treatment of RSJC as current literature remains unclear in whether this cancer should be treated as a colon cancer with neoadjuvant radiation, or as a rectum cancer with adjuvant radiation.
Methods: This was a retrospective study of RSJC found within the SEER database and identified from 2000-2018. We used semi-parametric regression and non-parametric survival analysis to identify significant factors associated with mortality as well as univariate and multivariate analyses to screen and check for associations between factors.
Results: Analysis is currently ongoing.
Conclusions: Analysis is currently ongoing.

EMILY ROOK; JEREMY GARZA; DR. JANE COLMER-HAMOOD, PHD; DR. JOHN GRISWOLD, MD; DR. ABDUL HAMOOD, PHD

Whole blood influences the activity of the recombinant Pseudomonas aeruginosa pyocin R2

Pseudomonas aeruginosa (PA) is a gram-negative pathogen that causes serious infections in immunocompromised individuals including severely burned patients. Once it colonizes burned wounds, PA translocates into the blood stream causing bacteremia, septicemia, septic shock, and multi-organ failure. The alarming rate at which PA antibiotic resistant mutants emerge necessitates the search for alternative therapies to treat PA infections. One such therapy is the utilization of pyocins–narrow spectrum antimicrobials produced by PA to eliminate other competitive bacteria. Using a laboratory medium (LB broth, LBB), we recently confirmed the efficient antimicrobial effect of the recombinant R2 pyocin (r-R2) against PA burn patient's isolates. Our long-term goal is to use pyocins to treat PA bacteremia in severely burned patients, which necessitates assessing pyocin's activity in blood. We hypothesized that whole blood influences the antimicrobial effect or r-R2. We examined this possibility using whole sheep blood (WShB), r-R2, and the burn patient's isolate 86 (BPI-86). At 4 hours post inoculation (HPI), the minimal bactericidal inhibitory concentration (MBIC) of r-R2 for BPI-86 was 2 µg/ml in LBB but 16 µg/ml in WShB. At 20 HPI and at 20 µg/ml, r-R2 only significantly (4 log) reduced BPI-86 growth. To determine if blood compromises r-R2's effect, we incubated r-R2 (20 µg/ml) in BPI-86 inoculated LB broth or WShB for 16 hours at 37°C, filter-sterilized the supernatant, fractionated it using 50 kDa cut off membranes (the R2 molecular weight is about 700 kDa), and tested the concentrated material (CM) using the zone of inhibition (ZOI) assay. Compared with LBB CM, WShB CM produced smaller ZOI. These results suggest that WShB influences r-R2's effect but does not eliminate it. Further studies, including using whole human blood and other burn patient's isolates, will be done to confirm these findings.

WM. ZACHARY SALTER, B.S.; WOOYOUNG JANG; B.S.; WINSLOW IDICULA, M.D.

Helical Rim Rhabdomyosarcoma - A Rare Case Report

Introduction: Rhabdomyosarcoma (RMS) is the most common type of pediatric soft tissue carcinoma, accounting for 5% of all pediatric cancers.[1, 2] RMS are malignant tumors of mesenchymal origin and can occur at any anatomic site demonstrating cellular differentiation toward muscle tissue, thus staining positive for desmin, vimentin, myoglobin, actin, and myoD.[3] In children 30-40% of RMS develop in the head and neck region, primarily in the base of the skull, nasopharynx, nasal cavity, and orbit.[4, 5] Outer ear locations are considered extremely rare with, to the best of our knowledge, only 5 reported cases.[5-9]
Methods: Presented here is a case of a 7 yo F diagnosed with a left helical rim rhabdomyosarcoma which was resolved by excision and subsequent chemotherapy and radiation treatments.
Results: The patient presented in this case study is a 7 yo F with no pertinent past medical history who presented to her primary care physician with a growing left auricular lesion. The mass failed to improve with levofloxacin and a seven-day course of steroids, and she was referred to ENT. On further evaluation, the lesion was suspected to be an auricular pseudocyst, and care options, including incision and compression of cyst with subsequent pathologic evaluation, were discussed. Surprisingly, the subsequent pathology result of the lesion was notable for high-grade sarcoma of myogenic origin. The patient was scheduled for re-excision of the left helical rim rhabdomyosarcoma, a central venous catheter placement, and a bone marrow biopsy. Following surgical intervention, the patient was referred to an outside facility for initiation of chemotherapy and radiation treatments. The patient tolerated the treatments well with no complications. Subsequent audiology evaluations were within normal limits.
Conclusion: This case documents a rare presentation of a rhabdomyosarcoma in an extremely rare anatomical position which was managed successfully.

DELANEY SAUERS BS, ASHLYN ANDERSON BS, MARK REEDY MD, DAUOD ARIF MD

Synchronous Invasive Ductal Carcinoma with Metastases to the Vulva and Endometrial Adenocarcinoma - A Case Study

Introduction
Breast carcinoma is a common type of cancer among American women and commonly metastasizes to the brain, bones, liver, and lungs. Only in very rare cases has breast carcinoma been known to metastasize to the genitourinary tract, and when it does, only a very small percentage of these metastases migrate to the vulva. An additional rare complication of breast carcinoma is the presence of multiple primary malignancies. This study reports the development of a primary breast carcinoma that metastasized to the vulva with the presence of a synchronous endometrial carcinoma.
Case Report
Our report describes a case of right primary Invasive ductal carcinoma (IDC) that metastasized to the left vulva as well as a synchronous endometrial carcinoma in a 38-year-old female. Investigation of a lump in her breast with a PET scan showed a left vulvar mass. While undergoing a radical resection of the vulva, the presence of grade 1b endometrial carcinoma was discovered. The vulvar mass was confirmed by pathology to be a metastasis of her IDC and the endometrial carcinoma was diagnosed as a synchronous malignancy.
Discussion
IDC metastasis to the vulva is extremely rare. We hypothesize that this occurred in the patient due to incomplete involution of the embryonic milk line, allowing for residual breast tissue in the vulva. Furthermore, the presence of synchronous endometrial malignancy in this patient adds to the uniqueness of this case. The patient has no history of any conditions that promote formation of synchronous cancers and lacks predisposing risk factors such as radiation and increased age.
Conclusion
IDC metastases to the vulva and synchronous malignancies are both extremely rare occurrences and are even less likely to occur at the same time as one another. It is necessary to screen IDC patients along the embryonic milk line to ensure no abnormal metastases are present.

COLTON SHEPHERD B.S., NATHAN BEHRENS B.S., JACK ALLEN B.S., ALEXANDER DORIUS M.B.A, EVAN HERNANDEZ, BRENDAN MACKAY MD

Medicare Patient Demographics and Health Characteristics for Orthopedic Surgeons for 2019

Introduction: This study analyzed the demographic differences between Medicare patients seen by orthopedic surgeons and family practice physicians.
Methods: The Center for Medicare and Medicaid Services' (CMS) Medicare Physician & Other Practitioners - by Provider dataset for 2019 was filtered by orthopedic surgery and family practice provider types to identify their patient demographics. Family practice was chosen as an assumed comparative group representative of the general Medicare population. A two-tailed, independent t-test was performed comparing orthopedic surgery with family practice to evaluate differences in demographic and health characteristics. An α of 0.05 was used for statistical significance.
Results: In 2019, all Medicare patient demographics and health characteristics reported by CMS differed significantly between orthopedic surgery (n=21,638) and family practice (n=84,471) specialties. On average, orthopedic surgeons saw more Medicare beneficiaries than family practice physicians (336.4 vs. 245.2). By reported race, orthopedic surgeons saw a greater proportion of white patients compared to family practice physicians (68.6% vs. 55.3%). All other reported races were within a 1% difference between the two specialties. There were fewer dual-enrolled beneficiaries (Medicare and Medicaid eligible recipients) seen by orthopedic surgeons than family practice physicians (15.6% vs. 20.8%). Orthopedic surgeons saw more beneficiaries with hyperlipidemia (60.5% vs. 56.0%) and hypertension (68.5% vs. 65.8%) than family practice physicians. The beneficiary average risk score for orthopedic surgery was less than family practice (1.293 vs. 1.372).
Conclusion: Our study found significant differences of varying magnitude in Medicare patient demographics between orthopedic surgery and family practice specialties in 2019. Orthopedic surgeons saw a higher number of Medicare beneficiaries, with a greater proportion of females and white patients. Additionally, a smaller percentage of dual-enrolled beneficiaries were seen by orthopedic surgeons. These findings emphasize the need for further investigation into the implications of these differences on outcomes and healthcare utilization for Medicare patients.

GABRIELLA SMALLIGAN; ELLIOTTE CANNON; CAROLINE PRESSON; KATHERINE LAKEY; GRACE PURCELL; CAITLIN TAYAG

Assessing and Improving College Students' Knowledge and Attitudes About Women's Health

Introduction: Access to accurate and empowering information about one's reproductive and sexual health is imperative for the physical and mental well-being of college-aged individuals. In an age where the majority of young people's information regarding this topic comes from unregulated sources, such as social media, it is important to identify and address this population's knowledge gaps relating to women's reproductive health.
Methods: This project utilized the TTUHSC School of Medicine P3-1 Rec Center Survey, an online survey instrument shared with participants at the Rec Center's TEXFIT conference from March 4-6, 2023. The survey, which included questions related to 6 common women's health topics, received a total of 22 responses. We chose to omit faculty/staff responses and focus on the young adult age group, leaving us with 20 responses. In our analysis, we calculated the average number of responses under each Likert scale category question (1 = not at all familiar/strongly disagree, 5 = very familiar/strongly agree). Question topics with an average score ≤ 3.00 were determined to have the lowest level of familiarity among the study population. In addition, we evaluated the average accuracy of respondents' answers to "select all" questions which contained 2 correct answer choices and 2 incorrect answer choices.
Results: We discovered that, among college-aged men and women, there is little to no knowledge regarding the prevention and treatment of UTIs, limited knowledge regarding methods of birth control other than oral contraceptives, and a large gap in knowledge regarding locations that offer STI testing and/or routine gynecologic care in Lubbock, Texas.
Conclusion: Significant gaps in women's health knowledge exist among male and female students surveyed. The most prominent gaps in knowledge within this group center on UTI prevention, STI testing resources in the local community, and alternative birth control methods.

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Empowering Diversity in Health: The Impact of the Health Careers Collaborative Program in Lubbock

Introduction:
The Health Careers Collaborative (HCC)--Lubbock, partners with Estacado High School and the Texas Tech Health Sciences Center (TTUHSC) School of Medicine to provide mentorship, early exposure to health careers, and an engaging curriculum for underserved high school students in Lubbock. This initiative targets high school students from low-income and/or underrepresented minority backgrounds. Sessions focus on mentor-mentee bonding, community engagement and health-related skill development such as CPR, tourniquet techniques and introduction to ER cases. This collaborative effort addresses disparities in healthcare by early exposure to healthcare careers, skill development and fostering diversity.
Methods:
At the start of the academic year, the leadership committee planned sessions based on HCC guidelines and advice from national leadership. Some sessions involved faculty members and students sharing their experiences in medicine, equipment from the F. Marie Hall SimLife Center at TTUHSC was used for hands on learning and developing critical thinking skills through case-based learning. Mentees will conclude the program with a finale research project later this May. Qualitative feedback from mentees is recorded through both pre-survey and post-survey assessments. For the 2023-2024 year, pre-surveys were collected, and post-surveys will be recorded at the finale to track and determine the program's impact.
Results:
Mentees and mentors are assigned groups and remained paired throughout the year. There are 21 mentors, 20 mentees, and 7 leadership committee members, forming 8 groups for optimal interaction during the session. Feedback and quotes recorded from sessions thus far have shown to be positive.
Conclusion:
Through well-planned sessions, ongoing mentorship, and early exposure, the HCC—Lubbock, aims to increase diversity in healthcare and reduce disparities. Empowering youth from underrepresented backgrounds contributes to a more inclusive future for the healthcare profession.

VARSHINI V. SURESH, DR. SATHISH SIVAPRAKASAM PHD, AND DR. VADIVEL GANAPATHY PHD

Control of Colonic Ketogenesis by Gut Bacteria: Role of Bacterial Metabolites

It is taught in medical school that liver is the sole site of ketogenesis for generation of ketone bodies. However, our recent studies have identified colon as another important site of ketogenesis and demonstrated the importance of gut bacteria in the maintenance of colonic ketogenesis. The rate-limiting enzyme in ketogenesis is the mitochondrial 3-hydroxy-3-methylglutaryl-CoA synthetase-2 (HMGCS2), which is decreased in antibiotic-treated mouse colon. This led me to hypothesize that bacterial metabolites are obligatory for optimal ketogenesis in colon. To test this hypothesis, we first monitored the effect of aqueous fecal extracts from mouse colon on HMGCS2 mRNA in a human colon epithelial cell line (NCM460). The expression of this enzyme increased >10-fold in cells exposed to the extract. We then wanted to identify the specific metabolite that elicited the induction. The principal bacterial metabolites in colon are the fermentation products acetate, propionate, and butyrate. Butyrate inhibits histone deacetylases and also activates the cell-surface receptor GPR109A. It is also the carbon source for ketogenesis. Another class of bacterial metabolites are tryptophan derivatives (indole acrylic acid, indole acetic acid, and indole aldehyde), which elicit profound effects on colonic epithelium via activation of the nuclear receptors AhR and Nrf2. We monitored the impact of these metabolites on HMGCS2 mRNA in NCM460 cells. All three short-chain fatty acids increased HMGCS2 mRNA. Interestingly, the tryptophan metabolite indole acrylic acid was much more effective and potent in inducing HMGCS2 than the short-chain fatty acids. Published reports have shown that HMGCS2 is decreased in colon cancer. Therefore, we examined Hmgcs2 mRNA in colonic mucosa from wildtype mouse, ApcMin/+ mouse, and polyps from ApcMin/+ mouse. We found a marked decrease in Hmgcs2 mRNA in ApcMin/+ mouse colon; the decrease was even more in polyps. These studies uncover a novel mechanism for gut bacteria in protection against colon cancer.

NEETI SWAMI BS, JENNIFER KRABACHER BS, BSN, RN, AVERY GARCIA BS, SEAN DALY BS, SIMON WILLIAMS PHD

Teaching Medical Students Emergency and Wilderness Medicine skills through a Scenario-based Learning Program

Introduction
Curricular activities for training pre-clinical medical students at the intersection of emergency medicine and wilderness medicine are uncommon. Past research suggests that scenario-based immersion experiences enhance student engagement and learning when compared to traditional didactic lecture sessions, particularly in clinical situations that require acute decision-making and action.1,2,3 To address this situation TTUHSC School of Medicine established an immersive experience entitled the Wilderness Weekend to teach emergency and wilderness medicine concepts and techniques through engaging and fun hands-on scenarios to first-year medical students. The Wilderness Weekend program consists of 16 emergency and wilderness medicine related stations, a Mass Casualty scenario, and student bonding activities. This research project evaluates the Wilderness Weekend program's impact on student attitudes and knowledge.
Methods
Participating students were sent a pre-survey before the program started and a post-survey upon program completion. Each survey contained a combination of questions focused on knowledge acquisition in areas covered by the program's learning objectives and Likert-scale questions assessing changes in student attitudes.
Results
Results demonstrated that students showed a mean 20% increase in student responses to knowledge-based questions (SD: 18.8). Statistical analysis showed that the mean post-survey score was significantly higher ($p<.0001$). Likert scale survey results also showed highly positive student feedback on the enjoyability/quality of the learning experience.
Conclusion
Overall, the Wilderness Weekend program is effective in increasing student knowledge on emergency and wilderness medicine while allowing medical students to enjoy themselves during the stressful preclinical period. In the future, this program could be replicated at other medical institutions to expand pre-clinical knowledge and exposure of emergency/wilderness medicine. Additionally, the program can be better evaluated with a larger sample size, stricter inclusion criteria, and more expansive data on attitudes.

SUBASH SWARNA, BS; VIVIE TRAN, BS; SEENA FIROUZBAKHT, BS; LEIGH A. JENKINS, MD; MOHAMMED M. ANSARI, MD

Utilization of VBX Expandable Covered Stents in Severe Calcified Aortoiliac Disease to Perform a Mini-EVAR

INTRODUCTION
Aortoiliac disease poses a significant challenge in medical management. While conventional approaches include medications, various interventions, and surgical procedures, some patients are high risk for surgery and percutaneous endovascular intervention. In cases of severe aortoiliac disease leading to CLI, the need for a more advanced solution becomes paramount. EVAR can be an option, however, a mini-EVAR by utilizing VBX expandable covered stents can widen narrowed arteries and maintain their patency. Beyond addressing the severe stenosis, they also serve as a safeguard against potential reclosure. This not only treats the immediate issues associated with aortoiliac disease but also can enhance long-term outcomes and prevent future complications.
METHODS
Male, age 64 with a PMH of PAD, CAD, femoral-femoral bypass graft, CABG, HTN, HLD, and vertebral occlusion presented to the ER with severe bilateral leg claudication.
RESULTS
Peripheral angiogram revealed severe CTO in the bilateral common iliac arteries. After crossing the stenotic and occluded vessels, a covered stent was successfully advanced through the bilateral common iliac arteries in a coordinated, unison direction towards the aorta. The stents were successfully deployed under high pressure covering the speculated calcium, showing excellent results with no signs of dissection, perforation, or distal embolization. Hence, severe CTO of the bilateral iliac arteries was successfully treated with excellent results. The patient was discharged from hospital for clinic follow-up.
CONCLUSION
Our case illuminates the impact of utilizing VBX expandable covered stents in severe aortoiliac disease. Beyond addressing immediate symptoms, this intervention has shown better long-term outcomes and proactively prevents future complications. This demonstrates that high-risk patients now have an option of a mini-EVAR, which can be safe and effective in treating severe calcified aortoiliac disease. In situations where conventional, simpler approaches falter, the implementation of these stents enhances our ability to manage the disease most effectively.

SOPHIE TALBOT; COLBY GORDON, MSHP; PAUL LIE, MPH; WILLIAM CHEN; VIVIE TRAN; ALEX HEO; DR. JEFF DENNIS, PHD

Impact of Training Videos on First and Second Year Medical Students' Stress of Working in Free Clinic Settings

Introduction: The Lubbock Impact Free Clinic offers medical students a valuable opportunity to begin practicing their patient-care skills in a real-world setting as soon as they enter medical school. However, training resources for the clinic have been limited leading to increased stress of medical students.
Methods: An Omnibus Survey was sent out to all eligible medical students at TTUHSC School of Medicine, as well as selected graduate students. The survey included 25 questions sets in a 5-point Likert scale to determine students' attitudes and feelings towards Free Clinic resources, stress when volunteering, and perceived usefulness of a Free Clinic Orientation Tutorial. 117 TTUHSC students responded to the initial survey. A set of tutorial videos along with a second Google Forms survey of seven questions in a 5-point Likert scale was sent out to all eligible TTUHSC School of Medicine and selected graduate students who had volunteered at Free Clinic. The second survey evaluated students' attitude and feeling of preparedness, confidence when volunteering, and usefulness of the videos.
Results: Prior to watching the provided Free Clinic Tutorial Videos, a majority of survey respondents felt overwhelmed their first time at the Free Clinic (55-60%). Over 66% felt that a Free Clinic Orientation Video would be beneficial to their volunteering experience. After watching the provided tutorial videos, most responders felt the videos were clear in the responsibilities and tasks expected from volunteers, were useful in helping new and current volunteers understand Free Clinic operations and workflow, and felt more confident in volunteering at the Free Clinic.
Conclusions: After reviewing the provided tutorial videos, students reported more confidence in volunteering at the Free Clinic and better understood the responsibilities and tasks expected. This may lead to increased workflow efficiency, shorter patient wait times, and higher patient satisfaction.

CAITLIN TAYAG, MSII; JOHN FREE, MSN; DR. MAHNOOR AZMAT, MD; DR. SAAD NAZIR, MD

Safety Profile of Aripiprazole for Psychosis in Pregnancy

Background: Aripiprazole is an atypical antipsychotic used to treat mental health conditions, such as schizophrenia and bipolar disorder. However, there is limited data regarding its safety during pregnancy, particularly in early stages, due to ethical concerns with conducting research on pregnant individuals. Women diagnosed with schizophrenia face an elevated likelihood of experiencing relapses during the ante- and postpartum phases, along with a heightened rate of psychiatric admissions during pregnancy (Edinoff et al 2022; Harris et al 2019). This literature review analyzes the current data available on the safety of aripiprazole use in pregnancy.
Method: The PubMed database was screened and filtered by using specific search terms, with no time limitation until September 2023. A total of 10 papers were reviewed in detail for this abstract.
Keywords: ""Aripiprazole",“Pregnancy”,“Antipsychotics”,“Psychosis”,“Schizophrenia”
Results: Aripiprazole's use in pregnancy has been studied to a limited extent and the available data comes from case reports and retrospective studies. Based on the data available, this literature review concluded that aripiprazole can be used as an effective treatment for psychosis in pregnancy. With proper management, aripiprazole can help reduce the psychotic symptoms in pregnancy while maintaining a relatively safe side effect profile.
Conclusion: The decision to use aripiprazole during pregnancy should be made on a case-by-case basis, taking into consideration specific circumstances and the individual’s mental health needs. Pregnant individuals should work closely with their psychiatrist to make informed decisions about their treatment plan. The safety and well-being of the mother and the baby are paramount in such situations. Further research specific to aripiprazole in pregnancy is needed in the future.

BREVIN THOMPSON; DR. BRITTANY BANKHEAD; JULIE CHUGH; DR. JOSHUA DILDAY; EUNJEE KIM; DR. DANIEL STUART; DR. RICHARD GALE; PETER KELLY; NICHOLAS WAGNER; NICOLE REMMERT

Improper Tourniquet Placement Among Soldiers: A Systematic Review of Potentially Survivable Deaths from Exsanguination

Introduction: Hemorrhage-related fatalities remain a significant concern, with preventable deaths often attributed to inadequate training in nonmedical personnel. The Stop the Bleed campaign seeks to address this issue by teaching effective methods for controlling extremity hemorrhage. However, existing training models lack realism, prompting the development of a new model with biofeedback and a lifelike feel. The goal of the project is to market the model to DoD for funding to make the models accessible to STB campaigns. To assess the current state of soldiers' tourniquet training and situational capability, a literature review is underway.
Methods: A database search using keywords like military, soldier, tourniquet, exsanguination, hemorrhage, survivable, and training was conducted. Papers are being analyzed for relevance to compile data on preventable deaths from exsanguination due to improper tourniquet placement.
Results (Anticipated): Out of 86 papers identified, ongoing review indicates pertinent findings. One study revealed that 83% of soldiers with tourniquets placed had distal pulses, suggesting ineffective application. Another study found 24.3% of 4,596 fatalities were potentially survivable, with 887 attributed to hemorrhage, including 170 junctional and 119 distal extremity wounds.
Conclusions: The reviewed literature underscores a critical need for improved military training. Analysis indicates that proper tourniquet placement could have potentially prevented 289 deaths. A novel biofeedback model under development holds promise for enhancing training efficacy, aiming to significantly reduce potentially survivable deaths from exsanguination at both junctional and extremity sites.

VIVIE TRAN, BS; ANDREW IBRAHIM, BS; SUBASH SWARNA, BS; SEENA FIROUZBAKHT, BS; MINNIE TRAN; DIXON SANTANA, M.D.; MOHAMMAD M. ANSARI, M.D.

Image-Guided Mechanical Thrombectomy Utilizing Penumbra Approach for Superior Vena Cava Syndrome as a Last Resort in Stage IV Lung Adenocarcinoma

INTRODUCTION
Superior Vena Cava Syndrome (SVCS) manifests as a constellation of signs and symptoms resulting from a mechanical obstruction of the SVC. This obstruction may occur suddenly or gradually, with malignancy and leads representing the primary culprit in a majority of cases. The typical scenario involves masses in the vicinity of the SVC exerting external pressure, resulting in the redirection of blood flow through collateral pathways. This condition results in impaired blood flow and venous drainage from the upper body, leading to symptoms such as facial and upper extremity swelling and dyspnea. Management includes radiation/chemotherapy, and stenting procedures, aiming to improve venous flow and alleviate respiratory compromise. We present a case of severe SVCS treated successfully with image-guided mechanical thrombectomy utilizing Penumbra.
METHODS
Female age 64, with PMH of stage IV lung cancer and COPD, presented with SVCS described as face, neck, and upper extremity swelling over one week. Pulmonary venogram showed a thrombus involving the bilateral innominate, subclavian, and axillary veins.
RESULTS
After reviewing the images, decision was made to proceed with mechanical aspiration thrombectomy of the SVC, IVC, IJ, and innominate veins with a Penumbra Indigo System. After sequential balloon venoplasties, SVC venogram showed good flow through the proximal bilateral innominate veins with improved luminal gain in the SVC. Due to concerns regarding stent thrombosis, migration, and rupture, the SVC was not stented. The patient left in stable condition and reported doing well on follow-up.
CONCLUSION
Our case highlights the successful resolution of profound thrombosis in a patient with SVCS. Medical management predominantly focuses on addressing the underlying cause of SVC compression, often entailing interventions such as radiation, chemotherapy, or recanalization with a stent. Notably, our findings suggest that mechanical thrombectomy may be a potentially safe, feasible, and effective approach when compared to stenting in certain scenarios.

SHRADDHA TREHAN; DR. LINDSAY PENROSE, PH.D.; DR. SAMUEL PRIEN, PH.D.

A Study of the Influence of Manmade Endocrine Disrupting Compounds found in the Environment on Pregnancy Outcomes in Assisted Reproduction

Introduction: The effects of endocrine-disrupting compounds on human health are not well understood, even though they are found in everything we use in our daily lives. Previous research has suggested that patients from rural areas who present for IVF may have lower semen and oocyte quality, and lower live birth-rates, than couples who present from urban zip codes in the same region. The goal of this study was to further understand the effects that organophosphates found in the West Texas environment specifically may have on pregnancy outcomes.
Methods: Pregnancy outcomes were obtained from Assisted Reproductive Technologies (ART) reports of 1350 patients who underwent IVF from August 2013 through November 2021. Pregnancy outcomes were recorded, as well as patient zip codes from driver's licenses. Based on census data using ZCTAs, zip codes were then separated into urban or rural categories. Statistical analysis was then performed to correlate pregnancy outcomes with the home environment.
Results: Preliminary analysis from a previous study suggested a trend ($P = 0.07$) towards lower live birth-rates in couples with rural home zip codes. In this study, it is anticipated that the observed trend toward lower live birth rate will reach significance. Further, it is anticipated that previously observed trends toward lower gamete quality will reach significance. Finally, it is anticipated that seasonal variations in IVF success rates will reach significance.
Conclusions: The population in this study lives in an agricultural environment heavily dependent on organophosphates. Current data suggests that there is lower gamete quality and lower live births in those living in the rural parts of this environment, where they would have larger exposures to these compounds, especially during the active agricultural season. Overall, pregnancy outcomes from ART may be affected by season and corresponding environmental factors.

MOSFFA ULLAH; BRADLEY KENT; MARYAM NIAZI; TRAVIS KASTNER; FACULTY FACILITATOR: GURVINDER KAUR, PH.D.

A Longitudinal Study of Socioeconomic Status and Medical Student Stress

Introduction:
We suspect individuals from higher socioeconomic backgrounds are at an advantage when applying for and attending medical school because of access to additional resources, mentors, and financial support. This study investigates students' socioeconomic status (SES) and its effect on perceived financial security and social support. This project will analyze data from first year medical students from the Class of 2025 and 2026.
Methods:
A 25 question survey measured perceived financial security and social support on a scale from 1-5 in reference to their medical school application process and their time spent as medical students. 94/96 responses were used for analysis from the Class of 2026. 85/89 responses were used for analysis from the Class of 2025.
Results:
Both cohorts showed an increase in reported financial support between lower income (2.43, 3.0) and wealthy (5.0, 4.86) students when applying to medical school. There was also an increase in social support between low income (3.71, 3.6) and wealthy (5.0, 5.0) when applying to medical school. There was a decrease in stress about finance in medical school between low income (3.81, 3.8) and wealthy (2.25, 2.14).
Conclusion:
A significant positive correlation between SES and perceived financial security and social support while applying to medical school was seen in both cohorts. Students from wealthy backgrounds reported higher levels of financial security and social support when applying to medical school compared to low income. This suggests that economic status may play a crucial role in shaping the social and financial process. While reported financial stresses showed negative correlation with economic status, it is noted that social stresses did not decline as expected, except for the group labeled as wealthy.

LUKE WHELCHEL; BEI ZHANG, MD, MSC; STEPHANIE STROEVER, PHD, MPH; ABDUL AWAL, BSC, MSC, MS

Physiatrists' perspectives on the optimal duration and determining factors of VTE prophylaxis following an acute stroke: A survey study.

Introduction: Venous thromboembolism (VTE) is a common and potentially fatal complication in immobilized post-stroke patients. While VTE prophylaxis using anticoagulants is standard practice, the optimal duration lacks consensus and is a common dilemma for physiatrists in the inpatient rehabilitation setting. Often, prophylaxis is continued until discharge or on the basis of ambulation distance (e.g., 150 or 250 feet). Such discontinuation practices are subjective and not evidence-based.
Methods: An anonymous survey was designed in Qualtrics and distributed to attending physicians and mid-level practitioners working in the acute inpatient rehabilitation setting. The survey explored VTE prophylaxis practices, reasons for duration selection, observed outcomes, and physiatrists' confidence levels. Data management and analysis was conducted using Stata/MP version 18.0, with descriptive statistics reported.
Results: 28 participants completed the survey. Commonly prescribed prophylaxis agents included Heparin (85.7%) and Enoxaparin (92.9%), with the majority of physiatrists continuing treatment until the time of inpatient rehabilitation discharge (53.6%). Ambulation distance (92.9%), and discharge disposition (home vs. facility) (82.1%) were deemed the most important criteria in the decision to discontinue prophylaxis. Yet, a significant portion (53.6%) did not feel their decision to discontinue VTE prophylaxis was supported by scientific evidence. The majority (71.4%) favored the development of a standardized protocol for discontinuation on the basis of certain criteria. Conclusions: Physiatrists' perspectives on VTE prophylaxis duration following acute stroke highlight a lack of confidence in the current decision-making process. Variability in practice and concerns about adverse events emphasize the need for evidence-based guidelines to optimize patient care. This study advocates for the development of standardized protocols to promote optimal VTE prophylaxis duration without undue extension or insufficiency.

JAKE WILEMON, MS; DR. CASSIE KRUCZEK, PHD

Medical student and residency leadership attitudes at TTUHSC School of Medicine in the era of pass/fail Step 1

Purpose: To determine the impact of pass/fail Step 1 on student, clerkship director, and residency coordinator attitudes towards developing a competitive residency application.
Methods: Surveys were sent to rising 3rd year medical students (MS), residency program coordinators (RC), and clerkship directors (CD) at Texas Tech University Health Sciences Center (TTUHSC). The MS survey focused on prioritized activities during their pre-clerkship phase. RC/ CD surveys regarded perspectives on success in clerkships and competitive residency applications.
Results: The MS survey was sent to the Class of 2025 (n=185), of which 52 unique responses were collected and analyzed. The RC and CD surveys had a total of 6 and 7 responses, respectively. MS rated lecture grades, self-care, Step 1/CBSE prep and leadership activities as highest priority pre-clerkship. In regard to competitiveness, Step 2 scores and research were also cited. MS indicated increased pressure to participate in activities like research. RC identified Step 2 scores as the most important factor in an application, with letters of recommendation (LOR) and communication skills rounding out the top responses. CD reported LOR's and outstanding academics and professionalism during clerkships as the most important application components.
Conclusions: We conclude that congruency exists between clerkship/residency directors and students regarding competitive residency applications. All cohorts agreed that Step 2 scores are a key factor. Students also feel pressure to participate in additional activities such as research. Our findings suggest that the transition to pass/ fail reallocated rather than alleviated student stress.

ALYSON WILLIS; FOSTER OGU; LASZLO NAGY, MD

Benign Intracranial Hypertension-Associated Chronic Headache in Congenital Cystinosis-A Case Report

Congenital nephropathic cystinosis (CNC) is a rare lysosomal storage disorder that is inherited in an autosomal recessive pattern. It manifests during infancy with early onset of end-stage kidney failure, cognitive and focal neurological deficits, neuro-ophthalmic pathologies, and various demineralizing and electrolyte-imbalance conditions. As a result, it is often compounded with secondary ailments and necessitates early kidney transplants. We present the case of a 12-year-old girl with CNC, Fanconi Syndrome, a 3-year prior history of a kidney transplant, and chronic sinusitis who presented with a constantly progressing headache with nausea and vomiting, and hypertension. The patient had a history of chronic sinusitis and secondary ailments, which were all properly managed with medication. After undergoing various differentials following clinical and laboratory workups and ICP monitoring along with a G-tube insertion, the cause of her headache was initially postulated to be intracranial hypotension (ICH) associated with ventriculoperitoneal (VP) shunt over-drainage and related to the G-tube as well. However, the G-tube was later ruled out as a potential cause. Abdominal ultrasound, radiologic imaging, shunt tap, and clinical and laboratory workups ruled out infections, distal shunt pseudocyst, and shunt malfunctioning. We propose that the over-shunting was due to potential low opening valve pressure or a consequence of benign intracranial hypertension (BIH) or pseudotumor cerebri effect on cystinosis brain tissue quality. Once over-shunting was identified, the shunt was externally increased from 2.0 to 2.5. The patient's clinical symptoms improved, and she was discharged home with a 2-week follow-up. She remained asymptomatic at the 2-week follow-up. Here, we hope to explore the relationship between BIH and congenital cystinosis. That is especially what clinical and neurological effects cystinosis brain quality and rigidity in the presence of BIH had on over-shunting without the development of hydrocephalus while affecting cognition.

JOHN M WOLPERT, MS MBA; CAROLINE PRESSON; NATHANIEL KIMBALL; BENJAMIN LIN; DR. LUIS BRANDI, MD; DR. NASEEM HELO, MD; DR. WERNER T W DE RIESE, MD PHD

Computerized Metric Assessment of Glandular Tissue Volume within the Peripheral Zone of the Prostate using combined MRI and Histopathology: Possible pathophysiological implications on Prostate Cancer development

Introduction and Objectives
Benign prostate hyperplasia (BPH) and prostate cancer (PCa) are the most common diseases of the prostate in aging men, and often coexist. However, the interactions are currently not well understood. Numerous clinic studies indicate an invert association between prostate/BPH size and the incidence of PCa supporting the hypothesis that BPH size may be protective against PCa. A recent pilot study reported reduced glandular tissue volumes in the peripheral zone (GVPZ) of large prostates as a possible explanation. Based on this study, we performed a combined MRI and histo-pathology study for direct assessment of the GVPZ to further verify this phenomenon.
Methods
In this retrospective study, patients underwent radical prostatectomies with prior pelvic mpMRIs for measurements of total prostate volume (TPV) and peripheral zone (PZ) volume. The histo-anatomical slides underwent computerized image processing. By combining MRI and histo-pathology parameters the following parameters were calculated: prostate capsule thickness (CapT), glandular tissue density within the PZ (GDPZ), and GVPZ.
T-tests and Mann-Whitney U tests were applied for statistical analysis. A level of $< .001$ was considered significant.
Results
72 patients were selected and 40cc of total prostate volume was determined as the optimal cutoff for the small-to-moderate versus large prostate subgroups. For these two subgroups, TPV showed significant ($p<.001$) associations with CapT, GDPZ, and GVPZ.
Conclusions
The study results revealed an invert association between TPV and GVPZ between small and large prostates, supporting the hypothesis that BPH size may be protective against PCa. Several studies suggest the transition zone growth in BPH leads to mechanical stress upon the PZ causing glandular tissue atrophy, observations confirmed in our study. As 80-85% of PCa originates within the PZ, this observation may explain the reduced incidence of PCa in large prostates. If future studies confirm our results, the outlined hypothesis will change diagnostics and treatment of BPH and PCa.

COLBY WOOD, BS, MARIANA FIORI, PHD, MICHAEL MELKUS, PHD, ALAN PANG, MD, STEPHANIE STROEVER, PHD, MPH, JOHN GRISWOLD, MD

Extended Split Thickness Skin Graft Viability in Cell Culture Media Over Time

Autologous skin graft is the preferred donor tissue for restoring large skin deficits. This is typically accomplished through split-thickness skin grafts (STSGs), which include the epidermis and a portion of the dermis. STSGs are best performed shortly after donor harvest, but there may be instances when tissue storage is necessary, such as limited donor availability or procedural complications. Traditionally, donor tissue is stored in saline solution at 4°C but this method causes tissue viability to rapidly decline, resulting in tissue being discarded after only a few days. In order to allow donor tissue to remain viable for at least one week, which is the average time a burn patient would require additional grafting, a reliable storage method must be established. This prospective study aims to examine the graft take of STSGs that are temporarily stored for a maximum of 7 days after donor tissue excision in burn patients when immediate use is not possible. This study will include excess pieces of skin greater than 10 cm2 following the grafting procedure. If the patient requires a graft post initial surgery, the patients will be grafted with the RPMI STSG leading up to a 7-day window if the graft is determined to be viable by the surgeons. STSGs will be stored in the commercially available cell culture solution Roswell Park Memorial Institute Medium (RPMI) and refrigerated at 4°C for a maximum of 7 days. The graft take percentage will be compared to the control group, which will be stored in saline solution using the traditional method. This is done with the intent to implement the commercially available RPMI at UMC for the preservation of donor tissue in a clinical setting.

LUCY YU, KAILIN OPELLA, MOHAMMAD M ANSARI, MD

Safety and Utility of Penumbra 12 Lightning System to Perform Mechanical Thrombectomy to Treat DVT in a Male Patient with May Thurner Syndrome and Submassive PE in One Pass

Introduction:
May Thurner Syndrome, also known as iliac vein compression syndrome or Cockett's syndrome, is a condition where the iliac artery compresses the iliac vein, impeding venous return from the lower extremity to the heart. This presents more commonly in women and individuals assigned female at birth and adults age 20-50. Often symptoms go unnoticed until individuals develop deep vein thrombosis (DVT). In this unique case, we have a male patient presenting with classic symptoms of May Thurner.
Case Presentation:
Male aged 58 with PMHx of HTN presented to an ER in New Mexico for severe left leg pain since 3 days. After diagnosing the patient with DVT, he was started on anticoagulation with heparin drip and transferred to our facility. Upon evaluation, patient presented with severe left leg swelling and decision was made to proceed with DVT intervention.
On detailed evaluation, patient was also found to have concurrent pulmonary embolism (PE). Prior to the procedure, the patient was also known to have polycythemia and testosterone supplementation. Utilizing mechanical thrombectomy system with flexible Penumbra 12 catheter, in one pass, both the DVT and submassive PE were successfully treated. Patient tolerated the procedure well with no complications.
Conclusion:
Mechanical aspiration thrombectomy utilizing the Penumbra 12 system was successfully treated both the DVT in our male patient diagnosed with May Thurner Syndrome, but also was able to handle the submassive PE. Our case is a glaring example of the presence of May Thurner Syndrome in male population, which goes undiagnosed and in addition, the submassive PE that was successfully treated, safely and effectively, with the same catheter system, saving cost and repeat procedures for the patient.

FERRIS ZEITOUNI MS, KRIPA SHRESTHA MS, ARIEL SANTOS MD

Urinary Bladder Injury, A 10 Year Experience in the Texas Panhandle

Introduction: Patients with traumatic abdominal injury commonly include concomitant damage to the bladder and management is dependent on injury classification as either intraperitoneal or extraperitoneal. Intraperitoneal bladder injury commonly requires surgery while extraperitoneal injury can be managed conservatively. We aim to describe and characterize the diagnosis and management of traumatic bladder injury in a rural hospital setting. We hypothesize that these injuries can be successfully treated at a Level III trauma center where urologic intervention is typically lacking.
Methods: Retrospective chart review was performed for all patients who presented with traumatic bladder injury to a Level III trauma center in Amarillo between 2006-2016. Variables collected included patient demographics, mechanism of injury, and hospital-related outcomes, urology consultation, associated injuries, mortality, and postoperative complications. Analysis was performed using the Student's T test for continuous data and Chi-square/Fisher's exact tests for proportional data. Significance was set at P=0.05.
Results: From 2006-2016, n=96 (0.65%) patients presented with bladder injury. Most injuries were extraperitoneal n=53 (55%), followed by intraperitoneal n=32 (33%), and combined n=11 (12%). The average age at presentation was 35.8 ± 17.6 with a predominance of male sex n=71 (74%) and Caucasian race n=61 (63.5%). Only n=2/53 (3.8%) of extraperitoneal injuries were repaired by a Urosurgeon. In the intraperitoneal group, Urosurgery was consulted for n=19/33 (59%) injuries, while n=14/33 (41%) were surgically repaired by a general or trauma surgeon. Compared to the intraperitoneal injury group, those with extraperitoneal injury had a higher mortality rate (n= 11/53 [11.3%], n=9/32 [9.4%]) and rate of associated injuries (n= 51/53 [96.2%], n=23/32 [73.6%]).
Conclusions: Our findings add to the growing literature showing that traumatic bladder injury can be safely managed in a Level III trauma center by either urologists or general/trauma surgeons.

School of Medicine, years 3-4

ERIN ADAMS BA, KOFI AGYARE BS, CHRISTINA NWANKPA BS, GENESY AICKARETH BS, DELANEY SAUERS BS, AVERY GARCIA BS, JOHN GRISWOLD MD, ALAN PANG MD

A Retrospective Study Analyzing Anesthesia Intubation Criteria in Burn Patients

Introduction:
There has been ongoing debate regarding the efficacy of predictive measures for difficult intubations in these cases. To assess patients' risk for difficult tracheal intubation, the medical field often relies on the Mallampati score. However, recent studies have revealed some limitations in using this score, as more than one-third of burn patients in burn centers have been found to have received unnecessary intubations. We hypothesize that pre-anesthesia assessments such as Mallampti score and submental distance have little to no effect on the intubation of burn patients in the head and neck area.
Methods:.
A retrospective database analysis was completed to determine the efficacy of pre-anesthesia assessments such as Mallampti score and submental distance on the intubation of burn patients. A group of 201 patients from January 1, 2015, to January 30th, 2022 at UMC were identified to fit our inclusion criteria. A chart review was then utilized on these patients, in which outcome variables such as length of stay (LOS), ventilation days, and BMI were examined. A linear correlation between each of these variables was performed against mallampati scores and submental distance to identify potential correlations.
Results:
Within this study we focused on adults requiring surgery aged 18-89 years of age. These patients were seen at the UMC Burn Center from January 1, 2010 to January 30, 2022. The correlation coefficient (R2) was 0.32 for submental distance and hospital length of stay.
Conclusions:
The correlation coefficient obtained suggests a slightly positive correlation between the two variables. This indicates that the longer submental distances were associated with longer length of hospital stay, which contradicts previous studies that longer submental distances are associated with easier intubations. In our case, the correlation coefficient of +0.32 demonstrates that the submental distance is not a predicting factor of LOS for the patients in our sample.

YAW ADU, SHANE METZLER MD, POOJA SETHI MD

A Challenging Case of Endocarditis in a Patient with Roundup Exposure

Introduction:
Endocarditis is an infectious condition caused by bacterial, fungal, or viral organisms and can result in severe cardiac complications. Here, we present a case of a patient who developed endocarditis as a complication of bacteremia.
Case:
A 50-year-old man presented to the emergency room with altered mental status, which begun 3 days after exposure to Roundup. His condition rapidly deteriorated, with symptoms including lower extremity weakness and incoherent speech. Lab results showed hyponatremia, hyperglycemia, azotemia, and elevated creatinine and troponins. Various imaging studies were conducted, including head CT, chest X-ray, and ultrasound.
Decision-Making:
Initial imaging showed no acute issues, but concern shifted to encephalopathy or septic embolism. The patient's condition worsened, leading to multiple infections, such as bacteremia, septic shock, and pyelonephritis. Urine and blood cultures confirmed Staphylococcus Aureus. As his condition deteriorated, cardiac complications emerged. A transesophageal echocardiogram revealed endocarditis with aortic valve vegetations and severe aortic regurgitation, leading to cardiac arrest. The patient experienced various cardiac rhythms, including ventricular tachycardia and fibrillation, ultimately resulting in his death.
Conclusion:
Clinicians should maintain a high index of suspicion for endocarditis in patients with unexplained systemic symptoms. Early recognition is vital to prevent severe consequences.

GENESY AICKARETH BS, ELIZABETH BROWN MD, ALAN PANG MD, MICHELLE TARBOX MD, JOHN GRISWOLD MD

A study in precision and ergonomics: A Cadaveric Study

Split-thickness skin grafts have remained the mainstay treatment for 2nd and 3rd-degree burns. Traditional dermatome (TD) and dermatome with a rotating circular blade (DRO) are devices that have been used for skin grafting since the 1900s and 2013, respectively. We conducted this study using varying levels of skin grafting expertise, gathered with both devices, and compared depth consistency across the graft.
The study was conducted on a deidentified cadaver. There were 4 levels of harvesters: pre-clinical medical students, residents, a burn fellow, and a surgical technician. All harvesters underwent basic training using each product's instructional videos. The depth gauge of each device was set to 0.009 inches. Each subject harvested a 5-in length graft using each tool from the back and leg. Each harvested 5-in section was punched in three locations and was analyzed for depth and sufficient graft harvest.
A total of 118 grafts were analyzed, and grafts taken by the TD were significantly thicker than the DRO (p-value of <=.046). When compared to the depth gauge setting of 0.009 inches, the TD averaged 33% thicker and the DRO averaged 11% thinner.

In this study, the DRO was closer to the desired depth value than the TD regardless of skill level. This is significant because the participants had drastically varying familiarity with the tools themselves. This study was the medical student's first time using the instruments, while the surgical technician used them for years. When using the DRO, all skill levels had decreased variability of thickness across the specimen.
This preliminary study shows that DRO offers skin grafts that are more consistent with the desired thickness and are uniform through the graft. A more constant graft thickness could possibly lead to better graft take and improved healing of the donor site.

MORGAN ALLEN; DR. CHERYL HASTON, MD; DR. KELLY KLEIN, MD; DR. CHARLA ALLEN, MD

A Case Study: SRY not SRY, 46XX male

Introduction: 46, XX testicular disorder of sexual development (TDSD) is a rare condition affecting 1:20000 births. Historically known as de la Chapelle syndrome, it usually involves translocation of the SRY gene onto the X chromosome resulting in testicular development and expression of male phenotype.
Methods: This case involves a 20yo G2P0010 who was found to have a sex discrepancy between her NIPT results and a 20 week anatomy ultrasound, the workup thus far and a discussion regarding NIPT and disorders of sexual development.
Results: NIPT results and ultrasound were verified and, at birth, a phenotypically normal appearing male was delivered. Urology and endocrinology were consulted and additional testing of the infant was performed. Repeat karyotype and FISH analysis failed to show any "common" genetic anomalies associated with 46, XX TDSD. To date, the infant has not undergone additional genetic testing and has follow up pending with endocrinology.
Conclusions: This is a very unusual case, and rare occurrence. The cause of this anomaly has yet to be determined and will require further testing. Future implications for the patient could involve abnormal development at puberty and infertility. NIPT testing has allowed early detection of these rare genetic anomalies which in turn should benefit patient's future health and the ability for families to understand the implications.

EMILY BAYSDEN, B.S; MPH, NEDHA KINNARE B.A.; DEVI NAIR, B.S.; BEI ZHANG, M.D; JOHN NORBURY, M.D.

The Significance of Electrodiagnostic Evaluation to Establish a Prognosis and Treatment Plan for Chronic Inflammatory Demyelinating Polyneuropathy

Case Diagnosis: Chronic Inflammatory Demyelinating Polyneuropathy
Case Description: A 75-year-old male developed numbness in his left hand and was diagnosed with a C6 radiculopathy based on an electrodiagnostic (EDX) evaluation. He became progressively weak, was diagnosed with acute inflammatory demyelinating polyneuropathy (AIDP), and began IVIG treatment. Over 3 months, he relapsed in quick succession despite IVIG, shifting his diagnosis to chronic inflammatory demyelinating polyneuropathy (CIDP). A second EDX study was performed in the hospital and showed a demyelinating process with a preserved median nerve compound muscle action potential (CMAP). He progressed to a near-locked-in state. Conversations to transition to hospice had begun, however, based on the presence of the CMAP on the second EDX study, ongoing plasmapheresis was initiated. He began to improve; months later, outpatient neuromuscular ultrasound (NMUS) showed slight coalescing of fascicles and an increase in cross-sectional area at the right forearm. He regained his strength and walking ability and eventually returned to his functional baseline.
Discussions: CIDP is an immune-mediated nerve disorder that follows a slowly progressive course. Current protocol recommends EDX only for diagnosis without follow-up studies unless severe complications arise. IVIG and plasmapheresis (+/- glucocorticoids) are standard of care for CIDP. The switch from IVIG to plasmapheresis is indicated in CIDP refractory to IVIG. Repeated high-quality EDX studies could provide a standard measurement tool to assess treatment progress. The line between AIDP and CIDP can be difficult to distinguish. Flexibility in diagnostic decision-making and treatment protocols is necessary to achieve the best possible functional outcome.
Conclusions: EDX evaluations in the acute care hospital can be helpful prognostic tools for patients with CIDP since CMAP amplitude at the time of diagnosis corresponds with the eventual functional outcome. Future research is needed to understand how neuromuscular ultrasound may provide an additional tool to clarify the diagnosis, prognosticate, and possibly monitor response to treatment.

RORIE BRISTER; CAITLYN MATEJKA

Penetrating Trauma Resulting in Fasciotomies: Review of Lower Extremity Compartment Syndrome

Introduction
Fasciotomies are common procedures in the surgical world. Research shows that most lower limb fasciotomies are performed after high velocity traumas, penetrating traumas with vascular compromise, and factures to the tibia. Detecting and treating acute compartment syndrome can be limb sparing, and fasciotomies are crucial to these patients. We present a case report of a 50-year-old man who experienced a unique penetrating injury to the RLE in which a 2cm rod passed between his tibia and fibula with no bony or vasculature accident.
Methods
This case was selected to the unique MOI and no bony or vasculature accidents that resulted in fasciotomies of the RLE.
Results
There are several mechanisms to screen for compartment syndrome. One way is objective findings on physical exam. It has been routinely remembered by the “Five P’s:” 1) paresthesia, 2) pain (passive ROM), 3) poikilothermic, 4) paralysis, 5) pulselessness. Another method of evaluating for compartment syndrome is through intercompartmental pressure of greater than 30mmHg. Our case used the first, as the physical exam was concerning for compartment syndrome. Although there were no bony or vascular injuries, the penetrating trauma was enough to cause compartment syndrome in the patient to result in need of fasciotomy with foreign body removal. Our patient also underwent primary closure (sutures and approximation) on the lateral wound, and negative pressure would VAC with secondary intention healing to close the medial wound.
Conclusion
Compartment syndrome is an acute emergency that can lead to loss of limb and loss of life. Many factors must be considered before determination of treatment method. Failure to recognize compartment syndrome can be detrimental to the patient, whereas unnecessary fasciotomies can be harmful to the patient in many ways. Our case report covers the signs leading to decision for fasciotomies, the treatment, and the follow up wound care after discharge home.

AUSTIN BROADHEAD; NOAH WORLEY; CALEB HAWKES

Cryoablation for Thoracotomy Pain Management: A Review

Introduction:
Thoracotomy causes severe pain in the immediate postoperative period as well as chronic pain that can last for months to years. Poor management of this pain can result in respiratory failure, infection, and debilitating post-thoracotomy pain syndrome. The most common methods of pain management in thoracotomy are systemic narcotics and epidural administration of local anesthetic. This review aims to analyze the comparative efficacy of cryoablation (cryoanalgesia) as an emerging modality for pain management in thoracotomy.
Methods:
We conducted an investigative review of the relevant literature using PubMed database. Keywords included 'cryoablation', 'thoracotomy', and 'pain management'. Only peer-reviewed articles published in English were included. Two independent reviewers conducted an initial screening based on titles and abstracts to identify potentially relevant studies. Full-text articles were then assessed for eligibility by both reviewers.
Results:
While pain is a challenging metric to quantify due to its inherent subjectivity related to psychosocial and cultural considerations, this retrospective analysis shows potential improvements in post-thoracotomy pain symptoms with cryoablation as compared to the more common treatment options. Cryoanalgesia in the setting of thoracotomy demonstrated statistically significant pain improvement scores and reduced opiate requirement across multiple studies. Other potential benefits such as improved respiratory function tests, decreased length of hospital stay, and lower risk of complications have been suggested in the literature.
Conclusions:
This review concludes that cryoablation, specifically cryoanalgesia or cryoneurolysis, is a promising modality for thoracotomy pain control. Relative to other management options, it offers the potential advantages of being simple, inexpensive, safe, and efficacious. This analysis incorporates evidence from various metrics such as pain scores, opiate requirement, and histological outcomes. The emerging modality of cryoablation presents a viable alternative to traditional interventions and warrants further exploration in prospective studies for a more robust evidence base.

LUKE BROCKBANK BS, MARIBEL CASTRO BS, SHELBY CORBITT MS, EMERALD COURTNEY PA-C, MARK REEDY MD

Dedifferentiation of Primary Colorectal Adenocarcinoma Into Choriocarcinoma: A Case Report

Introduction: Choriocarcinoma is an aggressive malignancy classified as gestational or non-gestational. Non-gestational extragonadal choriocarcinoma (NEC) is an extremely rare malignancy with some forms arising from a primary adenocarcinoma that dedifferentiates into choriocarcinoma. There are only 28 reported cases in the literature of primary NEC arising from colorectal cancer in which all patients have died despite various standard chemotherapeutic and biologic therapies.
Case Description: The patient is a 48-year-old female admitted to gynecology oncology service with an 8-10 cm pelvic mass. She presented with a 3-month history of lower pelvic and back pain, 30-pound weight loss, and abdominal distention. Additionally, she had rapidly rising β-hCG, from 48 to 20,354 mIU/mL over 2 weeks. An urgent laparotomy identified a fixed solid mass involving the cervix, uterus, and upper rectum. Pathology reported a biphasic tumor containing primary rectal adenocarcinoma with dedifferentiation to choriocarcinoma. Serum β-hCG fell initially until two weeks post-op when it rose. CT scan identified liver metastases demonstrating choriocarcinoma. Germ cell regimen was started consisting of etoposide and cisplatin. After four cycles, liver metastases resolved and β-hCG was within normal limits. However, two months after chemotherapy, β-hCG levels began to rise. Olaparib, a PARP inhibitor was started while awaiting molecular profiling. This PARP inhibitor stabilized hCG levels after one week and decreased her levels after two weeks. Profiling of the tumor identified PD-L1 expression > 50%. Pembrolizumab 200 mg IV and paclitaxel 150 mg/mg was started every 3 weeks in addition to daily Olaparib. Despite a response after 3 cycles of therapy, at the time of writing this abstract, βhCG rose from 1 to 10 mIU/mL.
Conclusion: NEC is a rare disease with a poor prognosis with standard therapies. The identification of PDL-1 checkpoint proteins and other therapeutic options such as PARP inhibitors need to be considered for this deadly malignancy.

ANTHONY BRUCCOLIERE; VIVE TRAN, NASEEM HELO, ABDUL AWAL, STEPHANIE STROEVER, WERNER DE RIESE

Novel Clinical Risk Calculator for Improving Cancer Predictability of mpMRI Fusion Biopsy in Prostates

Introduction:
Prostate Imaging Reporting and Data System (PI-RADS) assists in evaluating lesions on multiparametric magnetic resonance imaging (mpMRI), but there are still ongoing efforts in improving the predictive value for the presence of clinically significant PCa (csPCa) with a Gleason grade group ≥ 2 on Fusion-Biopsy. This pilot study intends to propose an easily implementable method for augmenting predictability of csPCa for PI-RADS.
Methods:
A cohort of 151 consecutive patients underwent mpMRI Fusion and random US Biopsy as a result of having at least one PI-RADS lesion grade 3-5 between January 1st, 2019 to December 31st, 2022. A single radiologist read all films in this study applying PI-RADS V2.
Results:
Of the 151 consecutive patients, 49 had a highest lesion of PI-RADS 3, 82 had a highest lesion of PI-RADS 4, and 20 had a highest lesion of PI-RADS 5. For each respective group, 12, 42, and 18 patients had proven csPCa. Two predictive models for csPCa were created by employing a logistical regression with parameters readily available to providers. The models had an AUC of 0.8133 and 0.8206, indicating promising effective models.
Conclusion:
PI-RADS classification has relevant predictability problems for grades 3 and 4. By applying the presented risk calculators, patients with PI-RADS 3 and 4 are better stratified, and thus a significant number of patients can be spared biopsies with potential complications such as infection and bleeding. The presented predictive models may be a valuable diagnostic tool, adding additional information in the clinical decision-making process for biopsies.

BAO CATTEAU; XIYU LIU; TODD BELL, MD

Carnett Sign: A Simple Means of Diagnosing Chronic Abdominal Wall Pain

Introduction: Anterior Cutaneous Nerve Entrapment Syndrome (ACNES) is a commonly missed cause of chronic abdominal wall pain believed to be caused by entrapment of the abdominal cutaneous nerve by the anterior rectus abdominis muscle fascia. Although generic in presentation, the pain can be debilitating. Imaging and biomarkers are not helpful in diagnosing ACNES. Carnett sign, however, is a simple physical diagnosis maneuver to differentiate between abdominal wall pain and visceral pain. Methods: We present a case of pediatric ACNES to emphasize the importance of Carnett sign. Results: The patient was a previously healthy 14-year-old male with an 18-month history of abdominal pain. Initial evaluation at pain onset by multiple physicians was unrevealing. Ongoing pain led to the patient leaving school and multiple imaging studies and endoscopies. The patient was referred to our clinic due to concomitant hypermobility. Carnett sign was positive on physical exam, and a trigger point injection (TPI) was performed. Follow-up confirmed the pain had resolved within 24 hours of the TPI and had not recurred four years later. Conclusions: Our case emphasizes the importance of the Carnett sign in diagnosing abdominal wall pain conditions like ACNES. Increased use of the Carnett sign in routine physical examinations may significantly reduce the time and cost to diagnose, and treat, chronic abdominal wall pain.

SHELBY CORBITT MS, MARIBEL CASTRO, LUKE BROCKBANK, EMERALD COURTNEY PA-C, MARK REEDY MD

Gestational Choriocarcinoma 12 Months Following 35-week Twin Molar Pregnancy: A Case Report

Introduction: Gestational choriocarcinoma is a rare and aggressive trophoblastic malignancy. Choriocarcinoma can be subclassified as gestational (trophoblastic neoplasm) or non-gestational (germ cell neoplasm). The prevalence of molar gestation approximately 1/1000 pregnancies, while the prevalence of twin molar pregnancy is 1/22,000 to 1/100,000 pregnancies. A twin-molar pregnancy delivered by cesarean-hysterectomy who develops metastatic choriocarcinoma 12 months post-delivery, is one of the rarest oncologic conditions a gyn oncologist will encounter. Case Description: In this case, a 36-year-old Hispanic G5P3 presented with diffuse rectal bleeding, abdominal pain and anemia one year after cesarean-hysterectomy at 35 weeks. Twin A was a healthy female and twin B was a complete hydatidiform mole. Unfortunately, the patient never returned for follow up. Lab results demonstrated a hemoglobin of 5.3 g/dL and a quantitative β-hCG >1,000,000 mIU/mL. Choriocarcinoma was diagnosed. CT imaging found a left kidney mass, multiple liver lesions, pulmonary nodules and a jejunal mass. Esophagogastroduodenoscopy preformed to stop bleeding identified a mass identified a mass at the proximal jejunum. Following biopsy, the mass was coagulated and bleeding stopped. WHO prognostic score was >24, FIGO stage was 4b. A cumulative WHO score >12 is associated with increased risks of hemorrhage or metabolic complications during treatment, therefore she was treated with low-dose cisplatin/etoposide for two cycles followed by three cycles of EMA-EP (etoposide, methotrexate, actinomycin-D, etoposide and cisplatin). This regimen was chosen due to remarkable response to low-dose cisplatin/etoposide. At the time of this writing, the patient's β-hCG is 7mlU/ml.
Conclusion: We present a case of metastatic gestational choriocarcinoma presenting one year after cesarean-hysterectomy for twin molar pregnancy. The patient had a remarkable response following two cycles of low-dose cisplatin/etoposide and three cycles of EMA-EP. In the event of recurrence, pembrolizumab may be an option due to the tumor staining 100% for PDL-1.

ROBERT BLAKE FOUNTAIN

What diagnostic tests and measures help accurately diagnose persisting post-concussive symptoms in patients following sport-related concussion?

Introduction: In both children and adults, about 30% will experience persisting post-concussive symptoms (PPCS) following a sports related concussion and is defined by persistent symptoms lasting greater than 2 weeks in adults and greater than 4 weeks in children. There are a variety of factors both biological and psychosocial that can contribute to PPCS following sports related concussions, however, factors that are prognostic may not be useful weeks to months later for diagnosing, documenting impairments, or guiding treatment. Methods: Presented here is a literary review over sports related concussions focusing on the persisting post-concussive symptoms. These peer-reviewed studies must have included comparison of tests or measures affected by concussive symptoms between a concussive group and their own baseline prior to injury or another control group. Results: In this review, 26 articles were included in the qualitative synthesis, including 1016 participants with concussion and 531 in comparison groups. Studies were heterogeneous in participant characteristics, definitions of concussion and PPCS, timing of assessment and the tests and measures examined. Some studies found differences between individuals with PPCS and comparison groups or their own pre-injury assessments, but definitive conclusions were not possible because most studies had small convenience samples, cross-sectional designs and/or were rated high risk of bias. Conclusions: Based on the limited existing research, there is no indication of any other specific test or tool that has appropriate accuracy for clinical diagnosis in patients with PPCS. The diagnosis of PPCS continues to rely upon patient reported symptoms raising questions for the use of a standardized symptom rating scale to aid in future diagnosis/treatment. Current recommendations suggest a multimodal clinical assessment, ideally by a multidisciplinary team, for diagnosis and treatment of PPCS, but future research drawing on prospective, longitudinal cohort studies could help inform clinical practice.

NIKHIL GOGINENI; BARATH RANGASWAMY, MD; STEPHANIE STROEVER, PHD, MPH

Methods of Q-Bank Utilization in US Clerkships and Experiences from Longitudinal Learning Plan (LLP) in One US Medical School

Introduction:
There is an increased pressure among students to achieve a competitive score on their USMLE. Question banks (Q banks) are some of the most popular study tools among students. Several medical schools provide class-wide access to commercially available Q banks, however there is a paucity in literature about the optimal utilization methods or consensus about how to guide students to effectively use them as tools for exam preparation. We sought to explore students' and Clerkship Directors' perspectives on this.
Methods:
LLP (Longitudinal Learning Plan) implemented at our IM clerkship includes weekly faculty meetings with students to discuss progress, identify barriers, and coach students on customized strategies to improve their self-directed Q bank performance. After the clerkship, students were surveyed using a Likert-style questionnaire. Using CDIM open forum, we surveyed IM Clerkship Directors nationwide about methods of Q bank utilization in their clerkships.
Results:
Around 55% of students who had taken the SHELF exam agreed that LLP helped improve their scores. Among 40 directors who took the survey, most (78%) responded that they do not have a structured Q bank review, students complete Q banks on their own, but that faculty and house staff are readily available to coach students should they come up with queries. Formative feedback received revealed that some directors incorporated mid-point student check-ins regarding Q bank completion.
Conclusion
LLP is a tool that can be used to improve exam performance by coaching students on best practices and apply mitigation strategies for barriers of effective learning using Q banks. Faculty and staff can play a role in helping students to develop these strategies thereby reducing stress due to competitive exams. Although many medical schools do not have structured review meetings discussing Q bank utilization, such a program has been confirmed by our students to help improve scores.

BLAKE HARP, MBA; WERNER DE RIESE, MD PHD

Does Patient Age Influence Satisfaction Scores of their Physician? A Systematic Review

Introduction: Patient satisfaction surveys, used as a quality indicator, play a large role in determining both physician and hospital reimbursement and these standardized surveys are used heavily in Medicare's Quality Payment Program. Numerous papers report a scoring bias associated with non-modifiable patient demographics, such as age or gender. We performed a systematic review across multiple specialties to determine if patient age influences patient satisfaction scores of their providers.
Methods: A focused literature search according to PRISMA guidelines was performed from 2007 to the present using the PubMed database. Odds ratios were included from each paper or were calculated using the Practical Meta-Analysis Effect Size Calculator. The Forest Plot, Heterogeneity Test, and Egger's Test for Publication Bias Test were performed using STATA.
Results: Out of 387 reviewed papers, 12 articles were selected for this systematic review resulting in a total of 174,558 patients. Selected studies included overall hospital and surgical subspecialty data of patient satisfaction scores of their physician providers only. The overall analysis for inpatients and outpatients revealed an odds ratio (OR) of 1.26 (95% confidence interval [CI], 1.19 to 1.34; I2 = 99.3%; p value of <0.001). The inpatient setting showed an OR of 1.18 (1.07 – 1.30); I2 = 99.1%; p <0.001, whereas the outpatient setting showed an OR of 1.38 (1.24 – 1.55); I2 = 99.5%; p < 0.001. Funnel plot and bias test did not show publication bias in both the inpatient and outpatient settings (p-value of 0.242, and 0.139, respectively).
Conclusions: There is a positive and statistically significant relationship between patients' age and satisfaction with their physicians, meaning that older patients are more satisfied with their physicians than their younger counterparts in both inpatient and outpatient settings, which was more pronounced in the outpatient setting.

TAHA HASSAN, BS; PRANITHI BINGI, MBA; MERRY MATHEW, B.S.; ZHEYAR SEYAN, B.S; CHIP SHAW, EDD, MPH; STEPHANIE STROEVER, PHD, MPH; ALAN PANG, M.D.; JOHN GRISWOLD, MD

Altered Coagulation Activity in Burn Patients Treated with Albumin

Introduction: Burn shock is a systemic inflammatory response and potentially fatal complication of severe burns. Traditional management of burn shock utilizes fluid resuscitation, which involves the administration of crystalloid or colloid solutions, consisting of albumin and plasma. Albumin has recently gained traction as a component of this fluid resuscitation; however, it has demonstrated anti-coagulant activity. This study aims to determine the effect of albumin administration in resuscitation therapy on coagulation in burn patients.
Methods: To accomplish this goal, we used electronic medical records from a level 1 burn center to compare the indicators of coagulation change in individuals receiving albumin as a part of resuscitation therapy versus those who are not. Exclusion criteria included patients taking anticoagulant medications and/or hemostatic disorders.
Results: A regression analysis included 245 observations for partial thromboplastin time (PTT) and 253 observations for prothrombin time (PT). The results indicated that total albumin levels showed a significant positive association with both PTT ($\beta = 0.051$, $p < 0.01$) and PT ($\beta = 0.008$, $p < 0.01$), suggesting an anticoagulant effect.
Conclusion: These findings highlight the potential role of albumin in influencing coagulation parameters. Total albumin was found to be correlated positively to the differences in partial thromboplastin time and prothrombin time, showing that albumin exhibits anticoagulant activity. The observed anti-coagulant effect of albumin highlights the importance of careful consideration and monitoring when using colloid solutions in burn management.

CALEB HAWKES, MBA; JARED IVAN; JACOB IVAN, MBA; NOAH WORLEY; AARON CHEUNG, MBA; AMMON HAWKES, JOHN CULBERSON, MD

Medicare Reimbursement Rate Trends in Hospice and Palliative Care Medicine from 2013 to 2022

The patterns of declining Medicare reimbursement rates over time have been documented in various disciplines of healthcare, but little research on geographic trends in Medicare reimbursement in the areas of Hospice and Palliative medicine has yet been done. We aim to explore these patterns as they relate to the field of Hospice and Palliative Medicine in this paper. The purpose of Hospice and Palliative Medicine is to reduce the mental and physical burden of serious illness by prioritizing quality of life throughout the disease course and mitigating factors that may contribute to patient and family suffering. With approximately 17% of the United States population over the age of 65 and projections for that percentage to grow, the need for Hospice and Palliative medicine is expected to increase. This study includes 44 of the most common Hospice and Palliative medicine Healthcare Common Procedure Coding System (HCPCS) codes and analyzes their national and statewide trends in Medicare reimbursement from 2013 to 2022. Across this time period, these HCPCS procedure codes demonstrated a national average inflation-adjusted total percent change of -18.44% and a national average inflation-adjusted yearly percent change of -2.24%. Of the 44 HCPCS codes analyzed, the top 12 accounted for roughly 95% of the total revenue and saw a total average inflation-adjusted percent change of -20.0% over the time period studied.
The implications of declining Medicare reimbursement for the future of Hospice and Palliative medicine are discussed.

NICHOLAS HOUSEHOLDER, BS, COBY RAY MD

Cyanoacrylate adhesive vs fast-absorbing gut suture for cutaneous closure in upper blepharoplasty: a systematic review

Abstract
Purpose: The choice of suture material for upper blepharoplasty remains highly variable and is often influenced by individual surgeon preferences. Fast-absorbing gut and cyanoacrylate adhesives offer distinct advantages due to their ability to biodegrade, namely increased patient comfort and convenience. However, the current literature lacks direct comparative studies on these materials, and questions persist regarding their strength, durability, and wound-healing characteristics. This review assesses the functional and cosmetic effectiveness of absorbable gut and cyanoacrylate for cutaneous closure in upper blepharoplasty.
Methods: The review focuses on studies published since 2000 that compare the use of gut sutures and cyanoacrylate in upper blepharoplasty. A systematic search was conducted using several databases. Inclusion criteria encompassed clinical trials or case series specifically assessing cutaneous closure in upper blepharoplasties.

Results: Five studies met the inclusion criteria and presented various outcomes. In some cases, cyanoacrylate closure demonstrated the potential for superior cosmetic results and a reduction in closure time. However, gut closure tended to show a higher risk of dehiscence compared to non-absorbable sutures, though cosmetic results may be equivalent. The included studies were limited by several factors.
Conclusion: The included studies were limited by thier design, small sample sizes, and limited follow-up durations. Objective measures for assessing cosmetic outcomes were often lacking, making direct cross-comparisons challenging. In summary, while absorbable gut and cyanoacrylate present satisfactory results in upper blepharoplasty closure, cyanoacrylate appears to hold promise for enhanced cosmesis and practical advantages. Surgeons may consider these alternatives over non-absorbable sutures, considering their resource-saving potential and patients' comfort.

MALLORY JENKINS, BA; NADIA TELLO, MD; TAM NGUYEN, MD

Large Oral Dermoid Cyst Resection with Postoperative Reduced Tongue Mobility – A Case Report

Introduction: Oral dermoid cysts are a rare finding. When they present, they typically are limited in size to 5cm, with a few cases between 5cm and 7cm. Treatment consists of surgical resection with the most common complication being recurrence. We present a case of a male who presented with an oral dermoid cyst measuring 7x6x4cm whose recovery was complicated by limited tongue mobility.

Methods: The patient was referred to the ENT clinic for evaluation of a mass on the oral floor that was causing changes in voice and dysphagia. At his initial presentation, he denied difficulty eating, drinking, and breathing and denied recent changes in the mass. Surgical resection was planned after MRI and CT ruled out the possibility of vascular malformation. During the operation, it was noted that the mass was displacing the intrinsic muscles of the tongue all the way to the sublingual triangle and care was taken to identify and spare the lingual nerve. Pathology report was consistent with a dermoid cyst.

Results: Post operatively, the patient was initially tolerating PO intake well and was discharged. However, on the second postoperative day, he presented to the ED with complaints of dysphagia. Bedside swallow assessment revealed no aspiration risks, so the patient was discharged with plans for outpatient follow up. At speech therapy the following week, the patient was noted to have reduced lingual protrusion and generalized oral weakness. Despite tongue mobility exercises, the patient continued to experience limited mobility for 4 months after resection.

Conclusion: It is presumed that this complication is due to the displacement of the intrinsic tongue muscle for an extended period by the mass. To our knowledge, only 1 case of an oral dermoid cyst has been documented at 7cm in size and none that mention complications resulting from tongue muscle displacement.

LEWIS KELLY; DHYANESH PATEL, MD; KELLY MCMASTER, MD

The Perfect Storm: Rare Instance of Seizure Induced by de Quervain's Thyroiditis Superimposed on Grave's Disease

Introduction

Thyrotoxicosis, also known as hyperthyroidism, is a condition characterized by excessive production and release of thyroid hormones (triiodothyronine or T3 and thyroxine or T4) from the thyroid gland. Thyroid storm is a severe and life-threatening exacerbation of thyrotoxicosis. While seizures are not a common manifestation of thyrotoxicosis, thyroid storm can lead to neurological complications, including seizures.

Methods

Here we present a case of the perfect (thyroid) storm occurring due to a combination of de Quervain's thyroiditis superimposed on Grave's disease.

Results

Patient is a 32-year-old male brought to the ED for complaints of continuous pressure like feeling in his neck with intermittent episodes of dyspnea and dysphagia. While in the emergency room, he had a single episode of a generalized tonic-clonic seizure. On physical exam, the patient appeared diaphoretic and was tachycardic (136 bpm), his eyes had moderate bilateral exophthalmos and palpation of his neck showed a tender goiter with multiple palpable firm nodules. Laboratory work-up showed elevated T3 and T4 levels with decreased TSH. Thyroid antibody panel results showed elevated thyroid peroxidase antibody and thyrotropin receptor antibody levels. Patient found to have thyrotoxicosis with exophthalmos and general surgery was consulted for Graves' disease. He underwent total thyroidectomy. Results from tissue pathology showed benign thyroid with scattered multifocal, small noncaseating granulomas. No chronic inflammatory infiltrate was present. No follicular or papillary neoplasm was identified. These findings are consistent with subacute granulomatous thyroiditis, also referred to as de Quervain's thyroiditis.

Conclusion

This case underscores the complexity of thyroid disorders and the potential for unusual presentations when multiple thyroid conditions overlap. The successful resolution through surgical intervention emphasizes the importance of a multidisciplinary approach in managing such intricate cases. The findings contribute to the expanding understanding of the intricate interplay between thyroid diseases, thyroid storms, and neurological manifestations.

NEDHA KINNARE B.A.; 1 STEPHANIE STROEVER, PHD, MPH; 2 STEVE CHARLES, PHD; 3 CLINT FAULK, M.D.; 4 LUAN LAWSON, M.D.; 5 PAMELA HOPKINS, PHD; 6 JENNIFER HODGSON, PHD; 7; JOHN NORBURY, M.D. 8

BICA: A Tool to Assess Student Performance in Conflict Resolution OSCEs

Objectives
Interprofessional collaborations are essential for providing quality and efficient care for patients; however, conflict can impair team functioning and result in ongoing issues with morale and negatively impact patient care. Conflict management training can increase trust and cohesion in teams. Previous research demonstrates the utility of using standardized professional (S-Pro) scenarios to evaluate learners' performances in professional conflict resolution, but it is unclear how learner performance should best be evaluated and whether evaluations are consistent across evaluators from different professional backgrounds. This study aims to determine if ratings of student performance in Objective Structured Clinical Exam (OSCE) scenarios are consistent among evaluators when using a standardized rating tool.
Design
S-Pro OSCEs were designed to teach conflict resolution to 4th year medical students. Student performance was rated by an interprofessional panel. Evaluators were trained with lectures, OSCE descriptions, video recordings, and group evaluations. The Brody Interpersonal Conflicts Assessment (BICA) tool was used to assess performance in conflict resolution. The conflict management style within the tool is broken down into nonverbal and verbal communication. Scores were analyzed with intraclass correlation coefficient (ICC), a two-way mixed model with rater fixed effects.
Results
Twenty-five medical students participated in the OSCE scenarios conducted by five different standardized professionals. Each OSCE was graded by six different evaluators. For verbal communication, the consistency of agreement of mean scores was high at 0.753. However, the ICC for mean scores in nonverbal communication was considerably lower at 0.441. The overall performance (combined verbal and nonverbal) is high with the ICC average at .702.
Conclusion
With training, evaluators where consistent in their assessments of participants, particularly in the verbal communication and overall performance domains. These results indicate that the BICA tool can be used as an objective method to assess students' conflict resolution skills.

MATTHEW J. LI; MARVELYN IWEH; MARIEL SCHROEDER; LORI THOMPSON; BERNARDO GALVAN, MD; MUJAHED LASWI, MD; IZI OBOKHARE, MD

A Rare Case of Colopancreatic Fistula: Diagnosis and Management

In recent years, acute pancreatitis has become one of the leading causes of gastrointestinal disorder admissions in United States hospitals. An exceedingly uncommon complication seen with chronic pancreatitis is pancreaticoenteric fistula formation. Fistulation has been reported to the stomach, duodenum, small intestine, colon, and biliary tract. Although colopancreatic fistulae are a seemingly uncommon complication, it is important to consider preemptively when patients may be undergoing pancreatic surgery, especially in case of severe/necrotizing pancreatitis. Untreated colopancreatic fistulae carry a high mortality and great consequence, therefore precautionary measures should be taken to minimize adverse effects and unnecessary patient morbidity/mortality. In addition, close follow-up post-pancreatic surgery is of utmost importance to detect possible enteropancreatic fistula formation before further complications and irreversible damage. We present a rare case of the diagnosis and treatment of a patient with necrotizing pancreatitis who developed a colopancreatic fistula over 5 months following hospitalization where he was diagnosed with severe necrotizing pancreatitis.

BENJAMIN LIN, LAUREN ROBINSON, BASEM SOLIMAN MD, JILL GULIZIA MD, AND STEPHEN USALA MD PHD

Autoimmune implications in a patient with Graves' hyperthyroidism, preeclampsia with severe features, and primary aldosteronism.

Background and Objectives: Graves' disease (GD) and primary aldosteronism (PA) are two pathologies that can cause significant morbidity and mortality. GD is mediated by autoantibodies, and recent studies have shown auto-antibody involvement in the pathophysiology behind both PA and preeclampsia. The coexistence of GD and PA, however, is reportedly rare. This report describes a unique case of Graves' hyperthyroidism and concomitant PA in a patient with a history of preeclampsia with severe features.
Case Presentation: The patient presented at 17 weeks pregnancy with mild hyperthyroidism, negative TSH receptor antibodies, and a low level of thy-roid stimulating immunoglobulins (TSI). Her TSH became detectable with normal thyroid hormone levels, and therefore no anti-thyroid medication was used. At 34 weeks she developed preeclampsia with severe features, and a healthy child was delivered; her TSH returned to normal. Seven months after delivery she presented emergently with severe hyperthyroid-ism, hypertensive crisis, and a serum potassium of 2.5 mmol/L. Her hyper-tension was uncontrolled on multiple anti-hypertensives. Both TSI and TSH receptor antibodies were negative. The aldosterone(ng/dl)/renin(ng/ml/hr) ratio was (13/0.06) = 216.7, and abdominal CT imaging demonstrated normal adrenal glands; a diagnosis of PA was made. Her blood pressure was subsequently controlled with only spironolactone, 50mg 2xday. Methimazole was started, but discontinued because of an allergic reaction. Consequently, a thyroidectomy was performed, and pathology revealed Graves' disease. The patient remained well on levothyroxine 125mcg/day and spironolactone 50mg 2xday three months after the thyroidectomy.
Conclusions: This patient manifested severe GD with antibodies undetectable by conventional TSI and TSH receptor assays and accelerated hyper-tension from PA simultaneously. These conditions were successfully treated separately by spironolactone and thyroidectomy. Autoimmune PA was considered likely given the clinical picture. The diagnosis of PA should be considered in hypertension with GD.

DEVI NAIR; EMILY BAYSDEN; NEDHA KINNARE; DR. MICHEL DIAB MD; DR. ANOSHA SHETIYA MD; DR. CRISTINA SANDERS DO; DR. JOHN NORBURY MD

SONOGRAPHIC DIAGNOSIS OF A KAPOSIFORM HEMANGIOENDOTHELIOMA SURROUNDING THE BRACHIAL PLEXUS IN A 10-YEAR-OLD: A CASE REPORT

Case Diagnosis:
Kaposiform Hemangioendothelioma surrounding brachial plexus.
Case Description:
A 10-year-old girl with Henoch-Schonlein purpura presented with a 6-month history of pain in the left anterolateral elbow, predominantly at night. She had weakness of the left bicep and shoulder girdle, discoloration of overlying skin, and tenderness over the left brachial plexus. On examination she had hemihypertrophy of the left upper extremity, 4/5 strength in the left shoulder abductors and elbow flexors, and diminished sensation to light touch along the lateral left arm. Electrodiagnostic (EDX) testing was normal except for a low amplitude of her LABC nerve conduction study. Neuromuscular ultrasound (NMUS) showed an intense hypoechogenicity of the peri-plexus tissue which was suspicious for neoplasm. Based on the NMUS results, the patient was taken to surgery urgently for exploration. A biopsy was performed which suggested Kaposiform Hemangioendothelioma (KHE). After starting the patient on Sirolimus her pain and weakness improved. Shoulder and arm function have remained stable since.
Discussion:
Unilateral, focal neuropathies arise from trauma, compression in fibro-osseous tunnels, and compression by masses such as tumors, as in this case. NMUS imaging is a powerful tool to distinguish between these possibilities while minimizing psychological and physical distress in the diagnostic process, particularly in pediatric populations.
Conclusions:
EDX diagnostic tools are often poorly tolerated in the pediatric population and do not provide visual confirmation of the etiology of nerve pathology. In this case, NMUS was crucial in identifying a neoplastic etiology of the patient's symptoms and facilitating timely diagnosis. Routine utilization of NMUS for focal disorders in the pediatric population allows for the timely identification and treatment of unusual etiologies, both improving diagnostic accuracy and the overall patient experience.

ZEID NAWAS, MS; HAFSA ZUBERI; KELLY MITCHELL, MD

Traumatic Optic Neuropathy Following a Soccer Practice Accident: A Case Study and Current Approaches

Introduction:
This report presents the case of a junior college female soccer player who suffered from traumatic optic neuropathy (TON) after being hit in the right eye by a heavy metal stake during practice. The incident exemplifies the unpredictable and inherently risky nature of sports participation. The patient's ocular injury occurred in an on-field, low-risk setting, highlighting that the risk of severe injury can arise from any activity on the sports field.
Methods:
The case was selected for its unusual nature and the potential to inform safety measures. The patient was assessed and treated following standard protocols for TON, including high-dose steroids, and her progress was documented through follow-up examinations.
Results:
The injury resulted in immediate and complete vision loss, and despite prompt medical intervention, including intravenous high-dose steroids, the patient's visual prognosis remained poor. This outcome reflects the challenges in managing such ocular injuries and reinforces the critical need for comprehensive safety measures, particularly the adoption of protective eyewear in sports, an often neglected precaution, even in seemingly low-risk situations.
Conclusions:
TON management, particularly in sports-related injuries, remains a significant challenge. The limited effectiveness of current treatments, such as high-dose steroids or decompression surgery, necessitates ongoing research into alternative therapeutic strategies. Additionally, this case stresses the importance of educating athletes, coaches, and sports organizations about the potential ocular hazards, the necessity of protective eyewear, and the need for immediate medical response to sports-related eye injuries.

JESSE NEELY, KANISHK GOEL, BARATH RANGASWAMY M.D., SRIKANTH MUKKERA M.D., JOHN GARZA PHD.

The Effect of Sleep and Exercise on Anxiety and Depression among Medical Students and Residents

Introduction: The correlation between sleep, depression, and anxiety is well-established in medical literature and has been thoroughly investigated. Decreased sleep and diminished sleep quality are associated with increased prevalence of depression and anxiety. Studies have demonstrated a direct correlation between depression/depressive symptoms and medical error rate, so investigating possible causes of increased depressive symptoms in medical trainees represents an opportunity for improving patient care and outcomes.
Methods: This is a single-center study involving 20 medical students and 20 internal medicine residents. Blood samples and subjective reports of sleep and exercise habits were collected. Participants were screened for anxiety and depression using GAD-7 and PHQ-9 questionnaires. The Spearman correlation test was applied to measure the association of sleep and exercise with GAD-7 for anxiety and PHQ-9 scores for depression. Sample data is summarized as mean and standard deviation and was assumed to be exchangeable under a true null hypothesis.
Results: Among the 40 individuals surveyed, hours of sleep ranged from 36 to 63 hours weekly with an average of 47.2 hours weekly. Only 8 individuals (20%) reported sleeping 49 hours or more weekly. We found that the number of hours slept weekly had a moderate negative correlation with PHQ-9 (Spearman $\rho = -0.452$, p value = 0.003) and GAD-7 (Spearman $\rho = -0.453$, p value = 0.003).
Conclusion: In our study, the number of hours slept weekly had a more direct correlation with depression and anxiety than any other factor including exercise type, exercise frequently, diet, and nutritional status. Our data suggests that prioritizing sleep in the setting of the medical training environment may have the most beneficial results for combatting anxiety and depression in this population. Further large-scale research is needed to study which factors contribute most to anxiety and depression in the medical training environment.

KEVIN NGUYEN B.S.; JENNA HOOTEN B.S.; OLUBUKUNOLA ADESANYA, MD, MSPH

Novel Case of Kratom-Associated Neonatal Abstinence Syndrome Presenting with Seizure-Like Activity

Introduction
Kratom is a growingly popular but poorly regulated stimulant and opioid. Kratom use often goes unrecognized as routine tests miss Kratom. Kratom-Associated Neonatal Abstinence Syndrome (KANAS) presents like other causes of Neonatal Abstinence Syndrome (NAS). KANAS-related seizure-like activity has not been reported.
Objective
Describe a novel case of KANAS-related seizure-like activity.
Methods
Case report.
Case
Our patient is an early-term 38.5-week appropriate-for-gestational-age male born to a 29-year-old G3P3 mother with opioid addiction in remission, PTSD, ADHD, anxiety, and depression on 20mg Fluoxetine daily. Prenatally, the mother used Kratom capsules 2-3 times daily, marijuana, and vape. Buprenorphine initiation reduced Kratom use partially. However, the mother stopped fluoxetine and buprenorphine months before delivery, using kratom only. The infant was being observed for NAS. Maternal and infant drug screens were negative. On day 5, NAS scores soared, prompting NICU transfer. The patient was irritable and jittery with increased tone, reflexes, and activity. NAS scores remained high despite comfort measures, warranting methadone and clonidine. Good response allowed medication weaning and discontinuation pending discharge.
On day 23, NAS scores spiked with rebound irritability. The infant started having unprovoked on-and-off myoclonic-seizure-like activity of all four limbs for 10 minutes. Patient appeared to be deeply sleeping. The movements continued despite the mother gently restraining her baby's limbs. Patient demonstrated post-ictal-like state upon awakening.
1-hour EEG was ordered after episode's cessation, no electrical seizure being reported. Head ultrasound, metabolic, electrolytes, physical exam, and sepsis workup were unremarkable.
Conclusion
In our case, other causes of seizure-like activity like sepsis, intracranial hemorrhage, sleep myoclonus were unlikely due to the presentation, laboratory, and head ultrasound. The episode occurred during an acute NAS exacerbation, making KANAS the probable cause. Overall, KANAS is a growing yet understudied issue. More research and regulations on Kratom, especially prenatally, are needed.

CHRISTINA NWANKPA BS; GENESY AICKARETH BS; ERIN ADAMS BA; KOFI AGYARE KANISHK GOEL BS; DELANEY SAUERS BS; JOHN GRISWOLD MD (PI); ALAN PANG MD

A Retrospective Study Evaluating the Effect of Anesthesia Time on Burn Patient Outcomes

Research indicates the efficacy of regional anesthesia in burn patients, facilitating intraoperative anesthesia, ameliorating postoperative pain, and aiding rehabilitation. Numerous studies have linked prolonged operative durations with escalated surgical risks across diverse surgical disciplines. Extended operation durations have been associated with heightened incidences of postoperative surgical and medical complications, prolonged hospitalizations, and increased mortality rates. Notably, prolonged procedures significantly elevate the risk of venous thromboembolism (VTE) development.
While previous research has established correlations between operation duration and extended hospital stays in various surgical fields, the impact of anesthesia duration remains unexplored concerning postoperative risks. Specifically, the influence of anesthesia duration on comorbidities, hospital length of stay, and postoperative complications among burn patients remains unexamined. Hence, this study aims to elucidate the correlation between different components of anesthesia time (preparation time, surgical duration, and postoperative recovery time) and postoperative risks. Given the broad demographic served by the UMC Burn Unit, this retrospective study promises a comprehensive analysis of a diverse patient cohort, enabling the identification and quantification of potential risk factors associated with anesthesia duration.
Our hypothesis posits that prolonged anesthesia time in patients with significant burns will correlate with heightened complication rates, including increased ICU days, prolonged hospitalizations, occurrences of infection/sepsis, and mortality. Analysis of 28 patients with significant burns revealed an average anesthesia duration of 166.75 minutes. Among these patients, the average BMI stood at 28.52, with an age range spanning from 18 to 69 years during hospitalization. The average hospital length of stay was 20.36 days, with an average of 16.1 days spent in the ICU. Approximately 32% of these patients experienced infections during their hospitalization, while there were no reported instances of postoperative mortality.

FOSTER OGU BS, MARCOS ARCINIEGA BS, LUIS F. CASTRO BS, JAKUB FORMELLA, PRASHANT CHITTIBOINA MD MPH

Surgical management of peripheral nerve sheath tumors

Introduction: Peripheral nerve sheath tumors (PNSTs) are a diverse group of tumors that arise from the peripheral nerve sheath and may occur sporadically or as part of inherited conditions such as neurofibromatosis type 1 (NF1). The management of tumors associated with NF1, specifically neurofibromas, provides valuable insights that can be applied to the overall management of all PNSTs. Neurofibromas, although benign, present unique challenges due to their involvement of crucial neural structures. In this chart review, we explore the indications for surgery, the principles of resection, as well as the pre-, intra-, and postoperative considerations, focusing on the critical role of neuromonitoring and tumor mapping in preserving functioning nerve roots. Additionally, we underline the importance of regular surveillance imaging in NF1, which can facilitate early identification of lesions likely to undergo malignant transformation.
Methods: A retrospective chart review of PNST surgical outcomes at the National Institutes of Health (NIH) was conducted. We identified 29 NF1 patients who collectively underwent surgical resection of 62 lesions between July 2013 to July 2023. Tumors were classified as either PNST or malignant PNST. Clinical symptoms, tumor location, tumor volume, and MRI findings were all collected.
Results: Most tumors were resected from the head, neck, and upper torso area (50%). The vast majority represented benign PNST lesions (95%) while a small minority represented malignant PNST (MPNST) lesions (5%). Our complication rate was similar to others, the most common being post-operative hematoma (3/41, 7.3%) and transient weakness or numbness (6/41, 15%).

Conclusion: Our analysis underscores the broader implications of these strategies for the management of all PNSTs, pointing towards a future where improved surgical techniques and medical therapy offer enhanced outcomes and quality of life for patients.

ROBIN OKPARA; KOFI AGYARE; DANIEL HO; KIRIE PSAROMATIS; VISHAAL KONDOOR

CSF Leak Secondary to Whiplash Injury

A dural puncture refers to an accidental injury to the dura mater of the brain, commonly occurring in the thoracic spine. This injury can result in cerebrospinal fluid leakage, leading to various neurological symptoms. Post-dural puncture headaches are usually the most common presenting symptom and the reason patients seek medical attention. Diagnostic imaging techniques, such as CT myelography or MRI, are typically used to diagnose dural punctures. If symptoms persist, an epidural blood patch may be necessary to seal the dural puncture and prevent further leakage of CSF. An epidural blood patch is a procedure where a small amount of autologous blood is injected into the epidural space to stop a CSF leak.
A 15-year-old female with no significant past medical history presented for an epidural blood patch upon referral from her pediatrician due to concern of a CSF leak. She had been experiencing severe chronic headaches that began shortly after an incidence of neck trauma, in which her neck hyperextended during a horseback ride. The patient was noted to be hemodynamically stable with normal lab values. Her physical exam findings were unremarkable. Thoracic spine images with intrathecal contrast showed significant extrathecal contrast at the lumbar puncture and injection site extending cephalad and along the left lateral margin of the thecal sac, exiting several neural foramen to at least T3-T4 levels. Under fluoroscopic visualization, a needle tip was placed into the dorsal epidural space at the T12-L1 level, where 15 mL of autologous blood was injected. The patient experienced significant symptomatic relief after the procedure, resulting in 80% improvement.
This case illustrates the prompt and accurate diagnosis of a CSF leak, leading to an optimal patient outcome. Recognition of a potential leak is critical to initiating appropriate therapy and preventing severe progressive neurological side effects.

RADHA PATEL; JESSE YORK; DONALD DAVENPORT JR., DO

A Severe Presentation of Complicated Sigmoid Colon Diverticulitis with Abdominal Abscess, Colocutaneous Fistula, and Large Bowel Obstruction

Acute colonic diverticulitis is a complication of diverticulosis, a common gastrointestinal condition marked by the presence of abnormal sac-like protrusions of the colon wall. In the United States, about 50% of the population have diverticulosis by the age of 60. However, in less than 5-25% of individuals with diverticulosis, the protrusions become infected leading to diverticulitis. This case shares multiple complications related to diverticulitis in a male in his 40s who presented with left flank pain, fever, chills, night sweats, watery diarrhoea, and weight loss. Family history included colon cancer in mother. Computed tomography scan at time indicated an abdominal wall abscess for which incision and drainage was performed. Colonoscopy after resolution of symptoms indicated sigmoid colon diverticulitis. Patient re-presented to emergency department after discharge with colocutaneous fistula and recurrence of symptoms. Laparotomy with sigmoid colon resection and end colostomy was performed for sigmoid colon obstruction. Later, patient developed signs of peritonitis for which exploratory laparotomy with subtotal colectomy and diverting end ileostomy creation was conducted. On day 38 after initial presentation, patient was discharged with wound care at home and follow-up appointments. In conclusion, unique course of complications presented in this case highlights the severity of diverticulitis and raises the question of how such complications can be detected, prevented, and/or better managed in the future.

NICOLE REMMERT1, SIVATEJA PATI1, HANNAH CHAUDHURY1, PABLO FEUILLET MD2, BARATH RANGASWAMY MD1

Cutaneous Coccidimycosis-The great imitator causing diagnostic delays

Coccidioidomycosis is a fungal infection caused by the inhalation of Coccidioides immitis spores. After inhalation of the spores, the infection can spread hematogenously or through the lymphatics of any organ. Due to this, the clinical presentation of coccidioidomycosis can vary greatly.
Patient is a 38-year-old man with obesity, who was referred to infectious disease (ID) due to a cutaneous coccidioidomycosis infection of his face. The patient initially presented to his PCP with symptoms of fatigue, knee pain, and a facial rash for a couple months. Initial treatment involved a course of oral antibiotics, yielding no improvement. Subsequently, the patient sought evaluation at a dermatologist's office for multiple lesions on his face and scalp. Another round of oral antibiotics and topical mupirocin ointment were prescribed. The lesions were biopsied, and a culture was obtained that resulted positivity for Coccidioides immitis. He was then referred to ID consultant. Physical exam revealed a scaling erythematous rash located on the right malar cheek, forehead and scalp. Vitals were stable. A chest CT was positive for multiple pulmonary nodules consistent with a history of coccidioidomycosis infection. Lab results revealed a cocci IgM 1.2, IgG 8.8, and an antibody by complement fixation of 1:128. The patient was started on oral fluconazole 200 mg daily, then increased to 400 mg daily. Patient started having improvement of his skin lesions.
We report an unusual presentation of cutaneous coccidioidomycosis as facial rash. Clinicians, especially in endemic areas, should be aware of the differing presentations of Coccidioides infections.

KAITLYN SANTINEAU; KADE ANCELL; ALEXANDER PARK; KELLY MITCHELL MD

Retrospective Chart Review of Emergency Center Ophthalmic Cases in Lubbock Texas, comparison to Odessa Texas: a 1 year review

Introduction:
The aim of this study is to investigate the etiology of emergency department admissions associated with ophthalmic pathologies in Lubbock and to compare these findings with those observed in Odessa.
Methods:
This study involves a retrospective review of medical records pertaining to ophthalmic cases seen in the emergency department (ED) in Lubbock in 2022. Patient demographics, cause of injury, and comorbidities were recorded. The data collected in Lubbock was compared to a similar chart review conducted in Odessa.
Results:
538 medical records were reviewed to determine the leading causes of ED admissions related primarily to ophthalmic pathologies in Lubbock. The mean age of patients was 45, and males constituted most of the study population.
The most common reason for ED visits was orbital fracture. The second most frequent reason for ED visits related to ophthalmic pathologies was corneal abrasion.
Visual blurring is another reason for ED visits related to ophthalmic pathologies. Among the 538 cases reviewed, 40% of patients reported blurry vision as one of their symptoms. In 65% of these cases however, blurry vision was an accompanying symptom of a systemic diagnosis. In the remaining 35% of cases, an ophthalmic cause was responsible for the blurry vision. These findings highlight the importance of thorough evaluations to identify the underlying causes of blurry vision and to ensure appropriate management.
Conclusion:
The Lubbock study's findings were distinct from those of the Odessa study, with notable differences in the reasons for ophthalmic emergency room visits. Corneal abrasion and foreign body in the cornea were the primary causes of ophthalmic emergency room visits in Odessa, while a larger proportion of patients with orbital fractures and visual blurring were seen in Lubbock. These differences suggest that the patterns of ophthalmic emergencies vary between Lubbock and Odessa. Understanding the underlying factors contributing to these variations warrants further investigation.

DZMITRY SAVITSKI; CHARLES ZHU; TENLEY ZHU; KRISTYN MCCOY; JONAS NANCE; DR. BALAKRISHNA KONERU, PHD; DR. C PATRICK REYNOLDS, MD/PHD

Impact of oxygen tension on establishing neuroblastoma cell lines and on assessing response to chemotherapy in vitro

Commonly, patient derived cancer cell lines (PDCLs) are cultured at an oxygen tension (pO2) of 20%. Neuroblastoma is the most common extra-cranial cancer of childhood, which commonly metastasizes to bone marrow. The pO2 of bone marrow, the most common location of neuroblastoma tumor relapse, is about 5% pO2 and the pO2 of the tumor microenvironment in vivo has been measured to be as low as 0.1% pO2. As our laboratory receives large numbers of viable tumors and bone marrow aspirates from neuroblastoma patients via the Children's Oncology Group to establish PDCLs we evaluated the impact of oxygen tension on the ability to grow neuroblastomas in vitro.
We assessed the ability to establish a tumor cell line from 945 bone marrow specimens and 299 primary tumor samples from neuroblastoma patients using pO2 of 2%, 5%, and 20%. We attempted to establish PDCLs from the 1244 total patient samples at all three pO2 conditions and achieved take rates of 10% in 20% pO2 and 19% in hypoxia (2% and 5% pO2). Of the 230 samples successfully established, 46% only grew in vitro in hypoxia. Cyclophosphamide (in vitro as 4-HC) + topotecan is the initial chemotherapy used for high-risk neuroblastoma. Out of eleven neuroblastoma PDCLs tested, seven of them were more resistant to 4-HC + topotecan when grown at 5% pO2 versus 20% pO2 tension ($p<0.05$ using two-way ANOVA) indicating that growing and performing drug cytotoxicity assays on neuroblastoma PDCLs at 20% O2 may overestimate the drug effectiveness.
Establishing neuroblastoma PDCLs in physiological hypoxia increases the ability to establish PDCLs from neuroblastomas and may provide more clinically-relevant in vitro chemotherapy response data. These observations may be applicable to other cancer histologies.

MARIEL SCHROEDER; DR. TETYANA VASYLYEVA

Genetic Testing for Wolfram Spectrum Disorder in a Patient with Recurrent Nephrolithiasis

Introduction: Wolfram syndrome spectrum disorder (WFS) is an autosomal dominant rare genetic pediatric disease affecting approximately 1 in every 160,000 to 770,000 people. WFS1 is characterized by childhood onset diabetes mellitus, progressive vision loss, neurological disease, and sensorineural hearing loss. Methods: Detailed is a case of a 12 year old female with a past medical history of Beckwith Wiedemann syndrome, tracheostomy, G-tube dependent, hepatoblastoma s/p resection, and microscopic recurrent kidney stones who presented to the clinic after passing black/brown specs and white crystals in her urine. The patient also had a history of improper bladder sphincter relaxing for which she was receiving Botox injections. Urine testing showed low citric acid, low magnesium, and low ammonium, putting her at high risk of nephrocalcinosis. Because of her complex medical history, genetic testing was performed. Results: Genetic testing resulted in a heterozygous p.Arg868His mutation of unknown significance for WFS. The use of sodium citrate and citric acid alkalized the urine to prevent the recurrence of kidney stones. Conclusion: This case highlights the importance of considering genetic testing in patients with a unique constellation of symptoms. Additionally, this case showcases the details of the management of microscopic recurrent kidney stones.

NATHAN STEELE, BS; HAFSA ZUBERI, BS; JONATHAN ALDRETE, MD

Analysis of Increasing Publication Importance and Costs in Dermatology Residency Applications
Introduction: Dermatology is often near the top of competitive specialties for residency applications. Due to changes in objective measures in medical school used to rank residency applicants, such as abandoning numerical USMLE Step 1 scores, other objective measures have gained importance, especially the quality and quantity of publications. The costs associated with publishing have steadily risen in recent years, reflected by higher publishing fees and the emergence of open access publishing models. The increasing importance and costs of publishing places a significant financial burden on medical students applying to dermatology.
Methods: In this study, we analyzed metrics and publishing costs of dermatology-focused academic journals. We performed a systematic search of the SCImago Journal Rank (SJR) to identify relevant journals. Journals were classified as open access or hybrid open access according to their publication model. For each journal, we gathered the following metrics: SJR and SJR quartile, H index, and article publishing charge (APC).
Results: Our study included 85 journals. APCs for these journals varied widely, ranging from $0 to $6850. The combined average APC was $2290.64 while the average H Index was 59.75, and average SJR was 0.622. APC compared to H index showed a statistically significant positive correlation between the two, $r = .605$, $N = 85$, $p<0.001$. APC compared to SJR similarly showed a significant positive correlation, $r = 0.584$, $N = 85$, $p<0.001$.
Conclusion: Our study illustrates the significant cost associated with meeting the average number of publications for a matched dermatology applicant and demonstrated a positive correlation between APC and journal prestige. As residency applications shift their focus from objective test scores and grades, the importance of publishing will increase the financial burden for students and their supporting programs, potentially creating an inequality between larger, more funded programs and their smaller, less funded counterparts.

MERON TESFAYE, RADHA PATEL,, BARATH RANGASWAMY, SRIKANTH MUKKERA, STEPHANIE STROEVER

Prevalence and Implications of laboratory abnormalities in medical students and residents with BMI > 25

Introduction
Obesity has become a global epidemic, and its prevalence has not spared the medical community, including students and residents, who are often expected to embody health-conscious behavior. This study investigates the prevalence and implications of laboratory abnormalities in medical students and residents with a BMI > 25, analyzing a broader spectrum of health indicators such as lipid profiles, glucose levels, and liver function tests.
Methods
Our study encompassed a cross-sectional analysis of 20 medical students and residents selected based on a BMI greater than 25. We systematically gathered and analyzed laboratory data from participants' medical records, ensuring confidentiality and adherence to ethical standards. Lab values, including lipid profiles, glucose, and liver enzymes, were classified as normal, high, or low based on established medical reference ranges.
Results
Our findings indicate a notable prevalence of elevated total cholesterol in 30% of participants, high fasting glucose in 10%, and abnormal liver enzymes in a subset of individuals. Additionally, the study revealed a high incidence of vitamin D deficiency (60%) and elevated Vitamin E-alpha levels (55%). Lipid profiles raised concerns with 30% of participants having elevated total cholesterol and a similar proportion with high LDL cholesterol levels. Risk factors for cardiovascular diseases were identified, with 10% of participants having high fasting glucose and triglyceride levels, along with liver function abnormalities in 10%. Thyroid function anomalies were observed in 5% of participants, indicating potential thyroid impairment.
Conclusion
The study calls for an integrated approach to health education and preventive care in medical training programs. Such integration is key to bridging the existing gap between theoretical knowledge and practical health application. By fostering a culture that values the health of caregivers as much as that of their patients, we can ensure a more holistic and effective healthcare system.

GEOFF THOMAS, B.S., MARINA ISKANDIR, M.D., MOHAMMAD M. ANSARI, M.D

A Unique Case of a Codominant Coronary Artery System in a Patient with Acute Inferoposterior STEMI

Background
Coronary arterial dominance is defined by the vessel which gives rise to the posterior descending artery (PDA), which supplies the myocardium of the inferior third of the interventricular septum. Most hearts (80-85%) are right dominant where the PDA is supplied by the right coronary artery (RCA). The remaining 15-20% of hearts are roughly equally divided between left dominant, in which the PDA is supplied by the left circumflex artery (LCX) (~10%) and codominant, in which both RCA and LCX supply the PDA (~20%).
Case Description
Patient is a 46-year-old male with a past medical history of hypertension, Type 2 diabetes mellitus, and family history of coronary artery disease who presented to ER with chest pain and tightness on exertion that radiated to bilateral arms. Shortly after presenting to the ER, he went unconscious with significant ventricular fibrillation on EKG, was defibrillated and brought back to normal sinus rhythm. Repeat EKG showed acute inferoposterior STEMI
Results
Left heart catheterization and angiography revealed CAD with thrombus of right coronary artery. In addition, angiography revealed a codominant system in which the PDA was supplied by both the RCA and LCX. Due to complete occlusion of the early RCA due to thrombus, visualization of the PDA off of the RCA was not possible until mechanical aspiration thrombectomy was successfully performed. Percutaneous intervention (PCI) was successful with excellent results and was discharged 2 days later.
Conclusion
Cardiac dominance plays a significant role in planning cardiac surgery or revascularization procedures. Codominant coronary artery circulation is a rather uncommon but notable variant of coronary artery anatomy. In a patient such as this one, a codominant circulation can impact clinical outcomes during ischemic events such as STEMI. Despite the RCA being occluded, the PDA was still able to receive circulation from LCX.

BRITNEY M. VILLEGAS, KATHRYN FURR, MS, JOSUE ENRIQUEZ, PHD AND MATTHEW B. GRISHAM, PHD

Adoptive Transfer of Allogeneic T cells into Mice Subjected to Reduced Intensity Conditioning Induces Selective Damage to Hematopoietic Tissue and Beneficial Intestinal Bacteria

A major limitation with use of hematopoietic stem cell transplantation to treat refractory hematological malignancies is the development of a multi-organ, inflammatory disorder called acute graft versus host disease. The use of myeloablative conditioning protocols (lethal irradiation and/or chemotherapy) for recipients prior to HSCT indiscriminately damages different tissues as well as markedly alters intestinal bacterial populations, both of which are thought to contribute to the development of aGVHD. No studies have determined how reduced-intensity conditioning (RIC) affects disease development and the composition of intestinal microbiota.
Objective: Quantify tissue damage and intestinal bacterial composition in mice subjected to RIC (sublethal irradiation) prior to transfer of allogeneic T-cells.
Methods: Syngeneic C57Bl/6 (Bl6) or allogeneic BM12 CD4+CD25- T cells (5x10^5 cells) were injected into sub-lethally irradiated Bl6 recipients. Tissue damage was assessed by histological examination and fecal bacterial populations were quantified using 16S rRNA gene sequencing.
Results: Injection of allogeneic T-cells induced severe bone marrow and spleen damage, resulting in pronounced anemia. No evidence of disease was observed in any other organ system nor was disease observed in mice engrafted with syngeneic T-cells. Damage to the hematopoietic tissues was associated with remarkable alterations in fecal bacterial composition when compared to their Syn controls. Of the 203 species identified, we observed 10^2-10^3-fold reductions in the relative abundance of “beneficial” bacteria known to produce lactate and short chain fatty acids (SCFAs) that include Lactococcus lactis, Allobaculum sp, Lactobacillis reuteri, Blautia ruminococcus and Alistipes finegoldii together with 10^2-10^3-fold increases of “detrimental” bacteria such as Enterococcus villorum and Akkermansia mucinophilia in Allo mice vs. Syn controls.
Conclusions: Adoptive transfer of allogeneic T-cells into RIC-treated recipients selectively damages hematopoietic tissue and lactate- and SCFA-producing intestinal bacteria. Because lactate and propionate are known to promote hematopoiesis, loss of these metabolites may negatively affect production of new blood cells.

DR. JOSHUA WILLMS, PHD; BEN MCCAULEY; KATE JUREK; JESSICA MORTENSEN; JESSICA RAMIREZ; PAUL LIE; LORI THOMPSON; RADHA PATEL; DAN PETROVIC

Proposing Ketamine Bridge Therapy for Acute Suicidality

Introduction: Suicide is a major cause of preventable death in the United States, and rates of suicide have increased consistently over the past two decades. One serious disadvantage of many current first-line treatments for suicidality (e.g., pharmacotherapy, including selective serotonin reuptake inhibitors) is that they may take several weeks (or even months) to start working. This is unacceptable given that patients may complete suicide during that critical window. Fortunately, ketamine therapy has emerged as a safe and effective intervention for acute suicidality. Further, ketamine is an especially promising solution to the treatment-response-onset problem for suicidality because it acts extremely rapidly—clinically meaningful effects have been observed within mere hours of administration. Therefore, in this article, we argue for using ketamine as a bridging therapy that can attenuate acute suicidality (and important comorbid symptoms) while creating time for other evidence-based therapies to take effect.
Methods: A systematic literature review of the PubMed, Scopus, and ClinicalTrials.gov databases was completed to identify studies on the safety and efficacy of ketamine in suicidal patients.
Results: In this article, we 1) Review the theoretical and empirical literature on the safety and efficacy of ketamine therapies for suicidality and expand upon our rationale for the proposed bridging approach; 2) Make comparisons to other areas of medicine where bridging therapies are the standard of care; 3) Present several models for how to integrate ketamine bridging into existing treatments for suicidality (e.g., pharmacotherapy, psychotherapy, inpatient hospitalization); and 4) Contextualize the risks of ketamine therapies.
Conclusion: We contend that, within the proposed bridging paradigm, ketamine therapies should be considered frontline treatments for suicidality, rather than last resorts to attempt after other interventions have failed. Our review presents novel, testable hypotheses that have promising implications for addressing the problem of suicidal mortality.

THOMAS B. YEATER; CALEB GOTTLICH, MD; DYLAN HOMEN, MD; BRYANT FLORES, MD; NATHAN BARUCH, MD; GEORGE BRINDLEY, MD

Dual-acting local infiltration analgesia for postoperative pain control in patients undergoing total knee arthroplasty

Introduction
Pain control in orthopedic surgery has been an in-vogue topic for the last several years with different iterations of pain protocols touted as new and improved. Due to the widely publicized opioid crisis in the country, there is a substantial push to decrease the amount of post operative opioid use. One of the newer FDA cleared methods of postoperative analgesia in orthopedic reconstructive surgery is Bupivacaine/Meloxicam (ZYNRELEF). Some have expressed concerns that this combination of medications can suppress local host immune defenses thus increasing risk of infection. Here we seek to compare infection rates before and after implementation of ZYNRELEF.
Methods
In this retrospective cohort study we identified 81 patients undergoing primary total knee arthroplasty; of those, 41 patients received the previous standard regimen of intraoperative Exparel injection compared to 40 patients receiving intraoperative Zynrelef injection for postoperative pain. STATA 13.0 (Copyright 1985-2013 StataCorp 4905 Lakeway Drive College Station, Texas 77845 USA) was used for descriptive and analytic statistical analysis of both primary (comparison of infection rates between two groups) as well as secondary outcomes.
Results
Average follow-up overall was 20.5±15.3 weeks and 29.2±16.8 weeks for patients receiving Zynrelef vs control group respectively. Because this was a consecutive cohort/change in protocol study follow-up length was significantly different between the two groups. We had a total of 8 (9.9%) patients with wound dehiscence (5 [12.5%] Zynrelef, 3 [7.3%] control, p=0.482). We had a total of 7 (8.4%) periprosthetic joint infections (3 [7.5%] Zynrelef, 4 [9.8%] control, p=1.00).
Conclusion
In our investigation in the comparison of infection rates in patients treated with Zynrelef for postoperative analgesia following primary total knee arthroplasty as compared to Exparel, we found no statistical significance. Based on this information, we do not feel Zynrelef increases risks of post operative infections.

JESSE YORK; JAMES O'TOOLE; ANDREA MAKOWSKI; ALYSSA WOODWARD; REBECCA SUK; ROMAN PETROV, MD, PHD, MBA; CHARLES BAKHOS, MD, MS, MBA; DORAID JARRAR, MD, MHCI; SAI YENDAMURI, MD, MBA

Select psychiatric comorbidities are associated with reduced long-term survival following lobectomy for early-stage NSCLC – an analysis of 5,516 patients

Objective: The association between psychiatric comorbidities (PC) and long-term survival following lobectomy for early-stage non-small cell lung cancer (NSCLC) is unknown. We sought to investigate this relationship using the Surveillance, Epidemiology, & End-Results (SEER)-Medicare registry.
Methods: Data for all patients in the SEER-Medicare registry who underwent lobectomy for stage I NSCLC from 2007–2013 were included. Those older than 80 years at time of diagnosis, with multiple cancers, or histology other than adenocarcinoma or squamous cell carcinoma were excluded. Patients diagnosed with depression, anxiety, bipolar disorder, schizophrenia, other (non-schizophrenic) psychotic disorders, unspecified mood disorder, attention-deficit/hyperactivity disorder, alcohol use disorder, or substance use disorder prior to lung cancer diagnosis were considered to have a PC. Survival of patients with PC was compared to controls using univariable and multivariable analysis adjusting for age, sex, race, stage (IA/IB), histology, and Charlson Comorbidity Index.
Results: Of 5,516 patients, 1,369 (24.8%) had PC. Patients with PC were more likely to be younger ($P < 0.001$), female ($P < 0.001$), Caucasian ($P < 0.001$), and have stage IA cancer ($P < 0.001$). PC was associated with shorter survival (median 2,478 vs. 2,820 days; $P = 0.002$). Multivariable analysis retained PC in the final model, with a hazard ratio of 1.10 ($P < 0.001$). Sub-group analysis revealed that this was driven by differences in survival of patients with schizophrenia ($P < 0.001$) and alcohol use disorder ($P = 0.006$).
Conclusions: Select psychiatric comorbidities are associated with reduced survival after lobectomy for early-stage NSCLC. Further investigations are warranted to better clarify this relationship and to optimize the care of this patient population.

CHRISTOPHER ZIAS, ROBIN OKPARA, VISHAAL KONDOOR

Urachal Adenocarcinoma: A Case Report of a Rare Tumor

The urachus is an embryological remnant of a channel between the bladder and the umbilicus; it typically involutes to become the median umbilical ligament, with obliteration of the lumen in the third trimester. However, in the case of partial involution, present in 32% of adults, numerous pathologies and potential malignancies can arise. Urachal carcinoma is a rare and aggressive type of bladder cancer, accounting for <1% of all bladder cancers. This tumor is typically located in the anterior wall or bladder dome. The prognosis of this cancer is typically poor; symptoms do not commonly show early, leading patients to present at advanced stages, with local invasion or distant metastasis. Because this cancer is so rare, there isn't a consensus on diagnostic criteria, staging, nomenclature, or therapeutic options.
The patient is a 34-year-old male who presented to the ED with severe, sudden onset sharp abdominal pain. An umbilical hernia was found at the site of pain. This hernia has been present for at least one year. A CT scan done in the ED showed significant free fluid within the abdomen in addition to a large ventral hernia. Physical exam findings showed tenderness to palpation at the umbilical site. The ED recommended ventral hernia repair in the OR. Surgery showed an incarcerated omentum and umbilical hernia with other findings of a small degree of abdominal ascites, a significant amount, i.e., greater than 3 L of gelatinous material, and a pelvic midline mass. Surgery brought the patient back for a second operation for a second look at the mass. A biopsy was conducted, and pathology showed mucinous adenocarcinoma. Oncology was consulted, a follow-up was recommended, and a referral to a tertiary center specializing in this rare cancer type. This case illustrates a pertinent example outlining an extremely rare disease's treatment and detection modalities.

HAFSA ZUBERI, B.S.; CORLEY PRUNEDA, M.D.; MICHELLE TARBOX, M.D.

Bilateral preauricular cysts: case report and review of literature

Introduction- Preauricular cysts, also known as preauricular pits or coloboma auris, are a congenital anomaly in which there is a nodule or sinus tract located anywhere adjacent to the external ear. Histologically, they are lined with stratified squamous epithelium with hyperkeratosis and parakeratosis; when severe inflammation is present, granulation tissue can be visualized. While they are most often benign and asymptomatic, they can become infected requiring treatment with antibiotics, drainage, or surgical intervention.
Methods- We present the case of a patient diagnosed with bilateral preauricular cysts followed by a brief review of therapeutic options to treat this condition, particularly cysts which recur or are refractory to medical management.
Results- A 61-year-old Hispanic male presented to the Veteran Affairs dermatology clinic for swollen masses anterior to his ears bilaterally. The patient reported that he had chronic swelling at the junction of his ear and cheek since the 1980s associated with dizziness, tinnitus, and hearing loss. Physical examination revealed a 33 x 18 mm flesh-colored mass adjacent to the right helical insertion and a 30 x 19 mm flesh colored mass adjacent to the left helical insertion. Dermoscopy revealed pits surrounded by hyperkeratosis bilaterally, and imaging confirmed the presence of preauricular cysts. The patient had not previously been seen by a dermatologist or otolaryngologist for this issue; however, he had undergone incision and drainage for the cysts in the past. He was prescribed 500 mg of azithromycin and referred to otolaryngology for evaluation and possible excision of the cysts.
Conclusion- This case highlights an uncommon entity that dermatologists should be aware of so that the appropriate workup and referral can be initiated. Treatment for preauricular cysts includes medical therapy such as antibiotics for inflamed or infected cysts and excision with otolaryngology for permanent removal.

Pharmaceutical Sciences

HARRISON BENSON; YUMA ORITZ; HEBA EWIDA; SYED TAREQ; HANIN DIAB; JON THOMPSON; JENNY WILKERSON; MAHMOUD SALAMA AHMED

Identification of EphB1/2 Tyrosine kinase Inhibitors for Chemotherapy-Induced Peripheral Neuropathic Pain

Background: Chemotherapy-induced peripheral neuropathy (CIPN) is one of the clinical consequences among cancer patients and survivors, leading to damage of the peripheral sensory neurons, lack of vitality, perception, and physical activity associated with significant emotional and social dysfunction. Due to the limited understanding of the molecular mechanisms that cause the progression of neuropathy and specifically paclitaxel-induced peripheral neuropathy, there is a lack of effective treatment for CIPN in clinical settings. Prior research demonstrated that the activation of Erythropoietin-producing hepatocellular carcinoma (EphB) receptor tyrosine kinase is involved in the downstream signaling of peripheral neuropathy. We leveraged our published X-ray crystal structure of EphB1 tyrosine kinase bound to chlortetracycline (PDB ID: 6UMW) to design and synthesize novel small molecules (named as AHM-based analogs), not related to tetracyclines scaffold. Hypothesis: Due to the need for new and non-addictive treatments for chemotherapy-induced peripheral neuropathic pain, we hypothesize that our previously modeled molecules will be effective treatments. Results: The newly synthesized molecules showed improved inhibitory profiles for EphB1 ranging from 700 nM to 5 μM. This was further validated to screen the top candidate against 140 tyrosine kinase and tyrosine-like kinases to show the selective inhibition against EphB1 and EphB2 tyrosine kinases at 66% and 56%, respectively; with no effect on the other kinases. Recent pilot studies involved two doses of AHM-014 (5.6 mg/kg and 17.8 mg/kg, via oral gavage) along with oral vehicle administration in the paclitaxel-induced peripheral neuropathy model to assess mechanical allodynia. Our preliminary results suggested that male C57BL/6J mice treated with AHM-014 (17.8 mg/kg, p.o.) display partial, but statistically significant, mechanical allodynia attenuation within 60 mins of acute administration, compared to vehicle. Future work: Our findings will elucidate the first in class EphB1/2 tyrosine kinase inhibitors and the associated molecular mechanisms in prevention or reversal of paclitaxel-induced neuropathic pain.

ANOUSHKA BHAT; DR. NADEZHDA A GERMAN

Delving into The Anti-Inflammatory Potential of a Potent Triple Negative Breast Cancer Drug

Introduction: TNBC accounts for about 10-15% of all breast cancers. TNBC has a high rate of cell invasiveness and metastatic rate, reducing the survival period. The absence of common breast cancer receptors (estrogen, progesterone, and HER2) makes its treatment challenging. Additionally, the high expression of pro-inflammatory cytokines exacerbates the condition. The connection of inflammation with cancer promotes tumorigenesis cascades altering the expression of tumor suppressor genes and oncogenes. Thereby, we aimed to design a drug that plays both roles as anti-cancer and anti-inflammatory improving the condition. Method: The anti-cancer activity has been already reported by our lab. We explored the anti-inflammatory potential of the drug by gene expression changes at mRNA and protein level, to explore the target. Results: The decrease in pro-inflammatory markers signified the anti-inflammatory activity of the drug. Investigating the inflammatory pathways, gave NF-kB as a potential target of interest. However, more studies are required to confirm other inflammatory pathways and downstream targets. Conclusions: Moreover, a thorough investigation is required to come up with an anti-inflammatory pathway in different cell lines and confirm the drug potential in vivo. The successful discovery of a drug with a dual role as anti-cancer and anti-inflammatory would help attenuate the disease complexities and would hopefully treat the disease with the least side effects.

JULIO ZUARTH GONZALEZ; ALEXANDRIA RAGSDALE; SUSHOBHAN MUKHOPADHYAY; NICHOLAS GUADAGNOLI; CHRISTOPHER MCCURDY; LANCE MCMAHON; JENNY WILKERSON

Mitragynine as a Potential Treatment for Methamphetamine Use Disorder.

In recent years Mitragyna speciosa (kratom) has become popular in the United States due to vast anecdotal evidence supporting its alleged effectiveness to self-treat substance use disorders, including methamphetamine use disorder. Kratom products contain numerous alkaloids, and the most abundant alkaloid is mitragynine (MG). The study aimed to test the hypothesis that MG attenuates methamphetamine self-administration. Male and female Sprague Dawley rats implanted with a jugular catheter were trained to self-administer methamphetamine (0.032 mg/kg/infusion) intravenously. Lever pressing for methamphetamine was established during 2-hour sessions, under a fixed ratio (FR) 1 schedule of reinforcement and gradually increased to FR5. The maximum number of reinforcers that could be earned was 100. Once responding was stable for 3 consecutive sessions, the effects of either vehicle or mitragynine (10, 17,8, 32, 56 mg/kg, i.p.) pretreatment were assessed. The order of the doses was counterbalanced. Methamphetamine led to significant lever presses on the active lever compared to the inactive lever. The highest mitragynine doses (32 and 56 mg/kg) attenuated methamphetamine self-administration. These results indicate that mitragynine shows promise as a potential therapeutic for methamphetamine use disorder. The effects of mitragynine should also be evaluated in non-drug reinforcers.

MD SARIFUL ISLAM HOWLADER, SURAJIT HANDSA, PRATHYUSHA NAIDU, MANUJSRI DAS, HIRANMOY DAS

Kruppel like factor 2 (KLF2) reduces parameters of coronavirus disease-related pathogenesis

To develop an effective therapy for Covid pathogenesis, an in vitro model was established by transfecting Covid nuclear (N) and spike (S) protein plasmids, mirroring human patient samples by elevating inflammatory markers while reducing KLF2 expression. This model also exhibited increased levels of oxidative stress, autophagy, and mitochondrial dysfunction, consistent with Covid-induced pathology. However, induction of KLF2 reversed these effects, reducing oxidative stress and autophagy markers while restoring mitochondrial function. Moreover, KLF2 induction minimized fibrosis-associated markers in an induced lung fibrosis model for post-Covid syndrome. In silico analysis showed strong interactions between GGTI298 (a chemical inducer of KLF2) and both Covid nucleocapsid protein and spike glycoprotein, validating KLF2's effect. These findings underscore KLF2 as a promising therapeutic target for combating Covid pathogenesis and mitigating post-Covid syndrome. By elucidating the mechanistic role of KLF2 in attenuating Covid-induced cellular responses, this research paves the way for novel therapeutic interventions aimed at ameliorating Covid-related complications and improving patient outcomes.

YASH MEHTA; DHAVALKUMAR PATEL; DR. IQRA PERVAIZ, PHD; DR. ABRAHAM AL-AHMAD, PHD

An LC-MS/MS based high throughput quantification of Glucose Transporter 1 (GLUT1) in human brain microvascular endothelial cells (BMECs)

20% of daily glucose uptake is routed to the brain. Its uptake is limited by the presence of a blood-brain barrier (BBB), and mostly occurring via the recruitment of glucose transporter-1 (GLUT1). Notably, GLUT1 deficiency syndrome (GLUT1DS) is a genetic disease caused by mutations affecting the GLUT1 activity and currently suffers from limited analytical tools to better understand and quantify such transporter in patients. The aim of this study is to develop an LC-MS/MS-based highly specific, selective, and high-throughput confirmative methodology quantify the GLUT1 protein expression in various endothelial cells.
"Bottom-up" approach was applied using trypsin as an enzyme to digest membrane proteins. In-silico digestion of the GLUT-1 protein was conducted using Skyline 22.2. Among the trypsin digested peptides, TFDEIASGFR (459-468 amino acids of GLUT-1 protein) emerged as the signature peptide for GLUT-1, recognized for its specificity and sensitivity. The retention time of the TFDEIASGFR peptide was verified using a chemically synthesized peptide. For quantification of GLUT-1 protein, three Multiple Reaction Monitoring (MRM) transitions were chosen based on intensity: 571.8 > 894.3, 571.8 > 537.2, and 571.8 > 650.3. Our results revealed the highest expression of GLUT-1 protein in IMR90-c4 iPSCs, with approximately 37 fmol of GLUT-1 protein per µg of membrane protein. Conversely, iBMECs, derived from iPSCs, exhibited a slightly lower expression at around 35.22 fmol of GLUT-1 per µg of membrane protein. Mouse cerebral cortex endothelial (bEND.3) cells showed 9.69 fmol of GLUT-1 protein per µg of membrane protein, while hCMEC/D3 cells displayed the least amount, measuring approximately 4.7 fmol per µg of membrane protein. Also, the time required from sample processing to analysis was 5-fold lower in LC-MS/MS-based quantitative method than antibody based analytical technique.
This analytical method offers high specificity, high throughput, and user convenience over the antibody-based assays for quantification of GLUT1 protein in cells.

SEJAL SHARMA, YONG ZHANG, DHAVALKUMAR PATEL, KHONDKER AYESHA AKTER, ALI EHSAN SIFAT, SOUNAK BAGCHI, EHSAN NOZOHOURRI, YESEUL AHN, VARDAN T. KARAMYAN, ULRICH BICKEL, THOMAS ABBRUSCATO

Evaluation of Systemic and Brain Pharmacokinetic Parameters for Metformin using Intravenous Bolus Administration

Introduction: Metformin's potential in treating ischemic stroke and neurodegenerative conditions is of growing interest. Yet, the absence of established systemic and brain pharmacokinetic (PK) parameters at relevant pre-clinical doses presents a significant knowledge gap. This study highlights these PK parameters and the importance of using pharmacologically relevant pre-clinical doses to study pharmacodynamics in stroke and related neurodegenerative diseases.
Methods: LC-MS/MS method to measure metformin levels in plasma, brain, and cerebrospinal fluid (CSF) were developed and validated. In vitro assays examined brain tissue binding and metabolic stability. Intravenous (IV) bolus administration of metformin to C57BL6 mice covered low to high dose range maintaining pharmacological relevance. Quantification of metformin in the brain was used to assess key brain pharmacokinetic parameters, such as the unidirectional blood-to-brain constant (Kin) and the unbound brain-to-plasma ratio (Kp, uu, brain).
Results: Metformin exhibited no binding in the mouse plasma and brain and remained metabolically stable throughout the assay duration. It rapidly entered the brain, reaching detectable levels in as little as 5 minutes. A Kin value of 1.87 ± 0.27 µl/g/min was obtained. As the dose increased, Kp, uu, brain showed decreased value, implying saturation, but this did not affect an increase in absolute brain concentrations. Metformin was quantifiable in the CSF at 30 minutes but decreased over time, with concentrations consistently lower than those in the brain across all doses.
Conclusions: Our findings emphasize the importance of metformin dose selection based on pharmacokinetic parameters for pre-clinical pharmacological studies. We anticipate further investigations focusing on pharmacokinetics and pharmacodynamics in disease conditions.

SYED MOHAMMED TAREQ, DR. HEBA A. EWIDA, SOUVIK PATRA, HARRISON BENSON, SUMAIH ZOUBI, HANIN DIAB, DR. JONATHAN THOMPSON, DR. PRASANTH K. CHELIKANI, DR. MAHMOUD SALAMA AHMED

Development of pan-EphB tyrosine kinase inhibitors targeting obesity and associated metabolic disorders

Background: Obesity is a chronic disease of high prevalence resulting in a significant financial burden to the US healthcare system. Current estimates highlighted the epidemic status of obesity up to 57% globally. The significant consequences of obesity are associated with the progression of various chronic disorders such as hyperglycemia, type 2 diabetes, dyslipidemia, cardiovascular disease, and heart failure. EphB tyrosine kinase receptor and its cognate ligand, Ephrin-B, have recently emerged as a promising target implicated in numerous pathologies, including Alzheimer's disease, anxiety, neuropathic pain, malignancies, fibrotic diseases, and viral infections. Previous studies validated the role of EphB4 tyrosine kinase in the insulin signaling, where genetic inhibition of EphB4 improved insulin resistance and glucose intolerance in obese mice. Hypothesis: We hypothesize that inhibition of Pan-EphB tyrosine kinase might provide effective ways to address obesity and associate metabolic disorders. Results: Herein, we report the in silico molecular simulations, synthesis, and structural optimization of 24 thienopyridine-based analogues (STA analogues). STA-based analogs showed potential binding and pan-inhibition for EphB tyrosine kinase signaling at nanomolar ranges using ADP-Glo assays. STA-013 revealed promising inhibitory profiles against EphB1 (IC50 = 900 nM), EphB2 (IC50 = 3.50 μM), and EphB4 (IC50 = 1.05 μM) tyrosine kinases. In addition, STA-013 showed selective inhibitory profiles against EphB1, EphB2, and EPhB4 tyrosine kinases while screening against 140 tyrosine kinases and tyrosine like kinases. Our in vivo studies showed that STA-013 induced whole-bodyweight loss and improved glucose homeostasis significantly in high fat diet (HFD)-induced obesity mouse models. This was coupled with in vivo molecular target validation via western-blotting to show inhibition of p-EphB signaling and activation of insulin signaling in isolated livers of STA-013 treated HFD obese mice. Future work: Our findings will elucidate the first-in-class potent pan-EphB tyrosine kinase inhibitors and their mechanistic role in mitigating obesity and associated metabolic disorders.

Biotechnology, Rehab Sciences, and Public Health

BIOTECHNOLOGY

ROZENN MOUNDOUNGA; DANIEL HARDY, PH.D

Genetic Characterization of Prion Protein Alleles in Deer and their Implications in Chronic Wasting Disease Susceptibility.

Pathological folding of prion protein (PrP) causes Chronic Wasting Disease (CWD), a transmissible and inevitably fatal neurological disorder affecting members of the Cervidae family, including deer, elk, and moose. Accumulation of PrP amyloid produces spongiform lesions and progressive degeneration in the brain. CWD has attracted considerable attention because it raises significant ecological and economic concerns due to its persistent spread across wild and captive cervid populations in North America and other parts of the world. Even though no animal to human transmission has been reported yet, the risk of it happening led to the need for testing animals living where CWD has been found. Unfortunately, existing tests cannot detect the disease early enough to contain it. Previous studies revealed that some Prnp alleles may confer resistance to infection or transmission, notably 95Q/H, 96G/S, and 226Q/K. However, it is unclear whether all potentially disease resistant alleles have been discovered. Here we characterize Prnp allelic variation in deer with the goal of identifying new SNPs that, alone or in unique combinations, could alter disease susceptibility or resistance. PCR using template DNA extracted from muscle of white-tailed, black-tailed, mule, or hybrid deer amplified 771bp products spanning the entire PrP coding sequence. To identify SNPs, we resolved amplicons on 1.5% agarose gels and Sanger sequenced the extracted DNA. We then compared the obtained sequences to the consensus on NCBI and recorded the genotype, looked at the trace for double peak that could indicate the presence of two different alleles, and determined if they led to an amino acid

change. The observed SNPs will then be used to identify disease susceptibility or resistance in deer, which if found, can help with selective breeding for resistant genotype.

Rehab Sciences

LAUREN ADAMS, MS; MADISON JENSON; ROBERT LARSON, OTR, PHD; TROY HOOPER, PT, PHD, ULRIKE H. MITCHELL, PT, PHD

Diaphragmatic Breathing in Swimmers and Other Sports: A Comparison of Geriatric Athletes

Introduction: Diminished diaphragm contractions have been observed in altered breathing patterns and have resulted in various pathologies. In young athletes, intense swimming workouts have shown an increase in cardiorespiratory function with higher lung function in swimmers than athletes participating in other sports. Respiratory function is known to decline with age, including a decrease in diaphragm muscle strength and decreased lung function. It is not clear, however, if differences exist between older people who competitively swim compared to older people who competitively perform other sport activities. The purpose of this study was to compare forced vital capacity (FVC), diaphragm thickness, and breathing mechanics (belly versus chest breathing) in swimmers and athletes participating in different sporting groups. Methods: 157 geriatric athletes, (75 males) participating in various sports (13 swimming, 33 softball, 25 volleyball, 29 racquet sports, 15 table tennis, 15 running/power walking, 6 golf/archery, 21 other) were included in the study. Diaphragm thickness was imaged at the end of exhalation using B-mode ultrasonography. Forced expiratory volume exhaled in one second was collected using a spirometer and breathing sensors were strapped around the participant's chest and abdomen to determine breathing mechanics. Swimmers were compared to each sport group individually using a series of Kruskal-Wallis tests. Results: No significant differences ($p > .05$) in FVC, diaphragm thickness, or breathing mechanism were seen between swimmers and those participating in the other sporting groups. Conclusion: Differences in respiratory function among geriatric athletes participating in varying sports do not significantly differ. This may be due to the already diminished breathing function and reduced strength of the diaphragm associated with aging.

VAISHNAVI CHIDDARWAR, MPT; KATHERINE WILFORD, PT, DPT, OCS, SCD; TROY HOOPER PT, LAT, ATC, PH.D.; C ROGER JAMES, PH.D.; KARTHICK NATESAN, MS; AARON LIKNESS, MS, CSCS; GESINE H. SEEBER, PT, PH.D., SCD;
TOBY BROOKS PH.D., ATC; PHIL SIZER PT, PH.D., FAAOMPT

The association between trait self-objectification, gender roles, and lower limb sensorimotor control during low- and high-impact tasks.

Introduction: Women sustain non-contact anterior cruciate ligament (ACL) injuries at a disproportionately higher rate than men. The injury risk continues to remain high despite sex-specific injury risk mitigation measures. Sex and gender have been used interchangeably in ACL injury literature. There is a need to explore the relationship between gender-specific sociocultural factors and lower limb sensorimotor control in active women during different tasks. Methods: We included 18 healthy, active, cis-gender women between 18-35 years. Participants performed 3 high-impact tasks (HIT) viz: drop-vertical jump (DVJ), single-leg DVJ using dominant and non-dominant leg, and 3 low-impact tasks (LIT) viz: stand-to-sit (STS), single-leg STS using dominant and non-dominant side. First, we used a Pearson correlation model to establish the association between tri-planar hip and knee kinematics during LIT with tri-planar hip and knee kinematics during HIT. Second, we used a Spearman correlation model to establish the association between gender role socialization score (GRSS), trait self-objectification score (TSOS), and tri-planar hip and knee kinematics during LIT and HIT.
Results: We found strong positive correlations ($r=0.77$-0.86, $p<.05$) between dominant hip/knee kinematics in the frontal/transverse planes during bilateral/single-leg HIT and LIT. TSOS showed a moderate positive correlation with non-dominant frontal plane hip kinematics during single-leg stand-to-sit task using the non-dominant side ($\rho=0.48$, $p=.043$). TSOS had a moderate negative correlation with dominant hip frontal plane kinematics during the drop vertical jump ($\rho= -0.52$, $p=.027$*). TSOS had a moderate negative correlation with non-dominant knee transverse plane hip kinematics during the stand-to-sit transition ($\rho=-0.52$, $p=.024$*). There were no significant correlations with GRSS.
Conclusions: The associations found in this study highlight the need to include gender-specific factors and daily-life LIT in ACL injury risk mitigation and screening.

VINTIMILLA A, JAMES CR, HOOPER T, BRISMÉE JM, JARMAN N, NATESAN, K, CHIDDARWAR V, LIKNESS A, ADAMS L, SIZER P.

The Effect of Exercise-Induced Central Fatigue on Cervical Spine Neuromuscular Function

Introduction: Central fatigue is prevalent in sports and poses risk for various injuries, yet its association with concussion risk is poorly understood. This study explores the interplay between central fatigue and concussion risk, delving into systemic impacts on the cervical spine. The neck's crucial role in force modulation raises concerns, particularly for fatigued athletes facing an elevated concussion risk. This risk may worsen for individuals with a concussion history. The study's primary aim is a comprehensive investigation into exercise-induced central fatigue's effects on head-and-neck neuromuscular function, encompassing non-vestibular structures like the visual system and cervical proprioceptors.
Methods: Subjects were divided into two groups based on their concussion history. Both groups underwent assessments on cervical joint position error, strength, and endurance concurrently with myoelectric assessment of cervical musculature, as well as vestibular domains prior to and following central fatigue.
Results: There was a significant main effect for "fatigue state" pre- and post-fatigue across various parameters, including constant ($p > 0.001$, $\eta p2 = 0.48$) and absolute ($p > 0.001$, $\eta p2 = 0.55$) joint position error, neck flexor endurance test time ($p > 0.001$, $\eta p2 = 0.89$), splenius capitis root mean square during cervical extension muscular strength testing ($p > 0.001$, $\eta p2 = 0.42$), sternocleidomastoid total power spectral density during cervical rotation muscular strength testing ($p > 0.019$, $\eta p2 = 0.17$), and King-Devick test time ($p > 0.009$, $\eta p2 = 0.20$).
Discussion & Conclusion: Exercise-induced central fatigue had a negative effect on cervical neuromuscular performance in subjects with and without a history of concussion. Notably, there were no significant differences related to concussion history, though moderate to large effect sizes imply potential differences in neuromuscular responses for subjects with a history of concussion. This study underscores the need for further research with more refined concussion history stratification.

Public Health and related Fields

HOANG HO, VIVIE TRAN, ANDREW IBRAHIM, MINNIE TRAN, MOHAMMAD M. ANSARI, M.D.

Evaluating ChatGPT's Role in Interventional Cardiology: Assessing Responses Related To STEMI And Cardiogenic Shock

Introduction: With ChatGPT's recent rise, many have sought to explore the relevance of this technology in medicine. We strive to investigate the potential applicability of ChatGPT in interventional cardiology by assessing the appropriateness of its responses to fundamental questions pertaining to STEMI and cardiogenic shock.
Methods: For this study, 20 questions centered around STEMI and cardiogenic shock were asked to ChatGPT. Inquiries covered risk factor counseling, prevention, test result analysis, and treatment, including medications, PCI, and hemodynamic device utilization. All responses underwent a thorough evaluation by a panel of 3 experienced interventional cardiologists. Experts examined the responses based on clinical knowledge, classifying them as appropriate, inappropriate, or unreliable. Two teams were created, and results were combined and analyzed for correctness.
Results: ChatGPT delivered appropriate responses for 16/20 questions (80%). No responses from the AI software were classified as inappropriate. In 4/20 questions (20%), responses were considered unreliable due to a lack of comprehensive detail surrounding the topic asked. Overall, ChatGPT supported hemodynamic device utilization for advanced stages of cardiogenic shock.
Conclusion: Our study demonstrated ChatGPT's capacity to offer primarily suitable answers to STEMI and cardiogenic shock inquiries. Given the continual progress in AI, the utilization of ChatGPT may benefit patient education on STEMI and cardiogenic shock. Additional investigations are essential to gain a comprehensive understanding of ChatGPT's role to further assess the utility and identification of hemodynamic devices for cardiogenic shock.

KIT MILLER

Enhancing Continuity of Care in Chronic Kidney Disease Management: Aligning Incentives and Responsibilities for Improved Patient Outcomes

The prevalence of Chronic Kidney Disease has remained consistent throughout time Globally; However, this population is growing parallel in nature to our rising population. The expenditures of this population are insurmountable, and exponential once kidney failure reaches a point of requiring renal replacement therapies. Such therapies require treatments from hemodialysis treatment facilities, which have been wrongfully penalized for their limited roles in controlling 30 day readmissions within this population. Although current models like the Chronic Care Model, or the comprehensive ESRD model attempt to address the issues arising from fragmentation, it has been the aim of this paper to identify the gaps in patient care that have arisen through misaligned incentives, misunderstood and miscommunicated provider responsibilities, and uncoordinated work flows that do not allow for such hetero-organizational interoperability. The findings presented in this paper conclude that there should be changes in incentives, work flows, and responsibilities between providers and organizations to properly align the behaviors of the respective organizations. Financial incentives should make a mutual responsibility between organizations to complete pre identified tasks. Such clarity and execution from both the hospital and dialysis facility, or primary care provider, will ultimately have the best impact on patient care, and reduce overall 30 day readmissions. When these incentives are properly aligned, true continuity of care can be created for patients. It is found that 0.1 increase in continuity of care for this population can decrease Medicare expenditures on 30 day readmissions for this population of over $4.2 Billion dollars. Specific incentives in part of the hospital include timely transmission of medical records following discharge. Whereas, a patient's dialysis facility or primary care provider can be responsible for the timely completion of a post discharge visit. Such tasks that are imperative to this visit include assessment of dry weight changes and the recovery of the acute illness, and medicine reconciliation. These incentives will properly facilitate a timely coordination of care that is required in patients of such complexity.

JENNIFER NOLL; ZACH SNEED, PHD; DANIEL STUART, PHD, MLS

A Scoping Review of Substance Use Prevalence Rates Amongst Subgroups of People Living with Deafness

Introduction:
Studies suggest that the deaf and hard of hearing (DHH) population has higher rates of substance use compared to the general population. However, many studies are limited in design, thereby not providing reliable measures of prevalence rates that distinguish between congenital and acquired deafness subgroups. This scoping review proposed the extraction of as much relevant current published data as possible to further identify gaps in the substance use research within these minority subgroups.
Methods:
We conducted a content analysis utilizing a scoping review methodology. Our search utilized PubMed, Embase, CINAHL, MEDLINE, Scopus, and other registries. This process returned 926 references which were imported into Covidence for review. We utilized multiple reviewers at each phase of the process, achieving 100% interrater reliability. The results are based on the full-text review of the included 17 studies. Covidence and Excel software platforms were utilized.
Results:
The current literature continues to suggest that DHH populations are at increased risk for developing substance use disorders (SUD) compared to non-DHH populations. Existing research supports the following: (a) DHH populations pose a higher risk of developing SUDs than non-DHH populations, (b) minimal research has been conducted on the prevalence of substance use (excluding alcohol and opioids) amongst DHH populations, (c) differences in motivations to use substances have been observed between DHH and non-DHH populations, and (d) various limitations and programmatic barriers continue to exist that prevent DHH populations from receiving adequate treatment.
Conclusions:
Due to the increased risk of SUDs among the deaf and hard of hearing population, further research is necessary to better equip treatment providers with the tools essential to helping these individuals. Neurobiological development

indicates the need for diverse substance use prevention and treatment efforts. We propose further SUD research includes deafness subgroups to better determine relevant prevalence rates and protective/risk factors.

DAVID VIZCAINO, DR. LISA GITTNER PHD

Using the Incarceration Rates of Diagnosed Mentally Ill Individuals to assess the Effectiveness of Mental Health Intervention Programs in Texas Jails. (Ongoing)

Due to such a large number of Texas' incarcerated individuals being diagnosed with a mental health illness, and the rising statistical chances of re-incarceration. There have been multiple in jail intervention programs put in place designed to keep such individuals out of jail. Nonetheless, the effectiveness of these programs is difficult to assess as the lack of standardization and inmate follow up have proven to be barriers to program competency studies. Therefore, with access to mental health diagnosis, drug screening results, and incarceration rates for those arrested in the Lubbock area; we aim to quantify the prevalence of psychological disorders in transgressors, as well as the probability of them being a repeat-offender. Indicating whether or not the prison intervention programs currently in place have met their goal of reducing the number of mentally ill individuals at their institutions. The study is ongoing, therefore no results can be confidently reported yet, but based on some preliminary analysis, a majority of those arrested in the Lubbock area are suffering from a serious mental illness (bipolarism, schizophrenia, psychosis, schizoaffective disorder, or major depression) and have been arrested numerous times. Even though our data is limited to the Lubbock area, it can serve as a representative example of the entire state due to the region's high diversity. Therefore, the results of this study can be used as a tool to determine the efficacy of mental health intervention programs at institutions across the state of Texas and aid in the creation of new ones if necessary.

Clinical Fellows and Residents

KAYDEN BARBER, MD; MASON PAYNE, MD; DAVID EDWARDS, MD

Baseball Bat to the Neck While Playing Football

Introduction:
An 18 yo male high school football player collapsed after helmet-to-helmet collision with an opponent while blocking during kickoff return. He reported severe pain in his neck, weakness of BUEs with numbness and tingling extending to his hands, and inability to move BLEs. His presentation was consistent with transient quadriplegia.
Methods:
The case was selected from our family medicine service hospital admissions as a unique example of nerve injuries in sports with important learning points. Despite the overall positive prognosis, the broad differential and potential complications make the case stand out.
Results:
Important differential diagnoses considered:
1. Transient Quadriparesis / Cervical Neurapraxia
2. Spinal cord transection or hemorrhage
3. Spinal ligamentous disruption
4. Spinal epidural hematoma with cauda equina syndrome
5. Conversion disorder
Based on MOI, negative diagnostic imaging, and improving deficits on physical exam, the final working diagnosis was established as: Transient Quadriparesis and Cerebral Concussion.
Conclusions:
Transient quadriplegia (Neurapraxia) is characterized as a compression injury leading to the loss of motor or sensory function in upper or lower extremities typically involving the cervical spine (Hsu, 2021). Loss of function is usually the result of hyperflexion, hyperextension, or axial load causing focal demyelination and may last seconds to days (Carballo Cuello & De Jesus, 2023; Hsu, 2021). High School football accounts for the majority of peripheral nerve injuries (71.3%) with player contact the most common MOI across sports (67.3%) (Zuckerman et al., 2019). Transient quadriplegia accounts for 7.5% of peripheral nerve injuries with identified causes (Zuckerman et al.,

2019). Follow-up is imperative as return to play guidelines are controversial with many recommending lifetime avoidance of contact sports after a second episode, ligamentous instability, imaging evidence of cord injury, and/or symptoms lasting over 36 hours (Hsu, 2021; Swiatek, 2021; Page, 2004).

DR. SARA AL DOGOM; M.D.;DR. LARA JOHNSON, M.D., M.H.S.

Screening for Celiac Disease in Pediatric Patients with New Onset Type 1 Diabetes: A Retrospective Study

Celiac disease (CD) is a common comorbidity in patients with type 1 diabetes mellitus (T1DM) compared with the general population. Classic intestinal symptoms of CD may not be present in patients with T1DM; therefore, screening is essential and can be done with sensitive and specific serologies including tissue transglutaminase (tTG) IgA and deaminated gliadin peptide (DPG) IgA and IgG. Positive serologies are further confirmed via histopathologic evaluation of duodenal biopsy specimens showing evidence of small intestinal villous atrophy and increased intraepithelial lymphocytes. Nonetheless, studies have shown that autoimmunity in the presence of T1DM may illicit CD autoimmunity in the initial phase of T1DM diagnosis rendering positive CD screens false upon further evaluation on duodenal biopsies. The aim of this study is to determine the incidence of false positive screening for CD in pediatric patients with new onset T1DM through conducting a retrospective study in hospitalized pediatric patients ages 2-18 years old between years 2012 and 2022.

JOHN FISHER, MD; CALEB GOTTLICH, MD; NEIL JAIN, MD; CYRUS CAROOM, MD

Sequential Interlocking Screw Backout in Patients with Retrograde Nailing for Complex Distal Femur Fractures: A Case Series

Introduction:
Retrograde nailing has been an excellent option for simple intra–articular or extra-articular distal femur fractures; however, treatment of very distal or complex intra-articular fractures has been limited by nail design. Advances in technology have resulted in the Synthes Retrograde Femoral Nail Advanced (RFNA) implant, which recently has been reported to have distal interlock screw disengagement or “shakeout” from the nail due to rotational forces after placement. In this case series we describe a variant of this complication with sequential backout of additional distal interlocking screws occurring after initial prominent screw disengagement.
Methods:
A retrospective chart review of two patients treated at a Level 1 trauma center from February 2023 to December 2023 was completed. Interval imaging was obtained to follow postoperative complications and treatment course.
Results
Patient 1 and 2, both elderly females, sustained periprosthetic distal femur fractures after a ground level fall. For patient 1, initial backout occurred six weeks postoperatively with two additional distal interlocks disengaging two weeks later. Removal of the RFNA implant was required. For patient 2, initial backout occurred 8 weeks postoperatively. Sequential shakeout of additional distal interlocks occurred after 4 and 6 more weeks. After revision surgery, backout was observed affecting the proximal interlocking screws.
Conclusions:
This study reports two cases of sequential screw backout in a newer-generation retrograde femoral implant. While the RFNA implant has been transformational in the treatment of distal femoral fractures, patients should be counseled on the risks associated with its use including the need for multiple procedures to remove sequentially backing out screws. More research is needed to characterize the factors contributing to this phenomenon and understand its etiology.

LAUREN FORD, MD; TREVOR BASSETT, MD; EUDYS BRICENO BRITO, MD

Coccidioides Meningoencephalitis in a 4-Year-Old male: A Case Report

Introduction: Coccidioidomycosis, or Valley Fever, is a fungal infection caused by Coccidioides immitis, which is endemic to the Southwestern United States, Northwestern areas of Mexico and South America. The disease is typically acquired via inhalation of spores that become airborne when soil is disturbed. The annual incidence of disease overall, and consequently disseminated disease, has been increasing over the last few decades, likely due to an increase in travel and an increase in immunocompromised hosts. CNS involvement can occur in anyone, although it is more likely to be found in immunocompromised patients. Methods: Here, we present a case of Coccidioidal meningoencephalitis in a non-immunocompromised four-year-old male from a small town near Abilene, TX that was diagnosed and treated at University Medical Center in Lubbock, TX. Results: The patient presented following a first time seizure episode after several weeks of non-specific symptoms including persistent vomiting, intermittent headaches and transient neurologic symptoms. The patient was seen by PCP and diagnosed with encephalitis and was given steroid burst and azithromycin treatment with reported improvement, until he had what was described as a tonic-clonic seizure which prompted presentation to the ED in Abilene and subsequent transfer to UMC. He had a witnessed seizure episode shortly after arriving, and imaging revealed hydrocephalus and leptomeningeal enhancement, as well as left transverse sinus thrombosis. During admission blood and CSF immunodiffusion Ab test results were positive for Coccidioides with reflex CF Ab titers of 1:64 and 1:32, respectively. Treatment was initiated with fluconazole, levetiracetam, and enoxaparin, and he underwent VP shunt placement. Conclusions: This case highlights the need for continued surveillance for fungal disease in our geographic area. Coccidioides meningoencephalitis can be fatal and should be treated with lifelong antifungals according to infectious disease experts.

MARJORIE HO, MD; PAMELA DAVILA, MD; WALTER DUARTE, MD

A Case of Autoimmune Limbic Encephalitis, Myasthenia Gravis, and Malignant Thymoma

Introduction:
Both anti-glutamic acid decarboxylase 65 (GAD65) limbic encephalitis (LE) and myasthenia gravis (MG) have been associated with thymomas. However, in very rare instances these two autoimmune diseases coexist together. We present a case of MG associated to malignant thymoma, who also developed a challenging case of LE.
Methods: NA
Results:
A 46-year-old man presented with a 3-month history of transient diplopia and generalized weakness that worsened through the day. He was found to have seropositive MG and started on pyridostigmine; associated with malignant thymoma and underwent surgical resection next month
Five months later, he developed new onset seizures and following his surgery, he developed agitation and confusion. Seizures were difficult to control. He underwent serial magnetic resonance imaging (MRI) of the brain, which showed multiple evolving subcortical/cortical T2 hyperintense lesions over the next 2 months, none of them with contrast enhancement. The lesions were bilateral, mainly affecting the left temporal lobe, but also affecting the right occipital, and bilateral frontal lobes. The electroencephalogram showed epileptogenicity from the left temporo-occipital region and right frontal area. Cerebrospinal fluid (CSF) did not reveal evidence of infection. Levetiracetam failed to control the seizures, and was later switched to brivaracetam and phenytoin.
Due to concern of autoimmune encephalitis, patient was started on high-dose steroids followed by cyclophosphamide. Serum and CSF autoimmune encephalitis panel yielded a positive result for anti-GAD65. The addition of steroids and anti-epileptic drugs finally controlled the seizures.
Conclusion:
This case highlights the rare coexistence of anti-GAD65 limbic encephalitis and MG in the same patient, probably converging together by a malignant thymoma. Anti-GAD65 LE has been associated with seizures and behavioral changes; rarely linked to malignant tumors (4-6%), most commonly thymoma [1]. Only one other cases of anti-GAD encephalitis associated to MG have been reported in the literature [2].

TYLER D. INGERSOLL, DO, ABOFP; JENNIFER MITCHELL, MD; BRENNA ELLIS, ATC

A Tale of Two Heals: Case Series on Management of Calcaneal Fractures

The purpose of this study is to compare similar but different injuries of the same bone in two collegiate athletes participating in separate sports. Each had a different mechanism, requiring contrasting management, with both injuries ultimately healing. Misdiagnosis can lead to a delay in recovery. A 22 y.o. male division one track athlete sustained an inversion ankle injury presenting with anterolateral ankle pain. A 23 y.o. female basketball athlete presented with acute on chronic anterolateral pain after hearing a pop while running. Case one had a CT scan and MRI to confirm a calcaneal stress fracture. He managed conservatively. Case two had two separate MRI's that demonstrated an incomplete dorsal anterolateral calcaneal stress fracture extending into the calcaneal cuboid articulation. She required surgery after failing conservative management. Calcaneal fractures are relatively uncommon and account for less than 2% of all fractures. It is the most common type of tarsal bone fracture. Calcaneal stress fractures occur after significant increase in athletic activity. The medial process of the calcaneal tuberosity is the lowest part of the foot arch that aids in stress conduction and weight bearing. During injury it can shift upward causing heel pain and alter gait. There is a prodromal pain for seven to ten days before onset of swelling. When suspected, initial evaluation includes lateral, AP and oblique x-rays of the affected foot. 60-70% of calcaneal fractures are intraarticular. Avulsion fractures should be considered if the mechanism of injury includes adduction and plantar flexion. In non-displaced fractures the use of elastic bandage, early weightbearing, and gradual progression of activities is indicated. ROM exercise and/or formal PT should be initiated as early as possible. NWB status for 8-10 weeks can be followed with serial radiographs. Surgical repair for fractures of the medial process of calcaneal tuberosity remains controversial.

DR. NORIKO MERIDA-MORALES, DR. CHARLA ALLEN, DR. JAMIE HAYNES

Title: Can you check behind me? The Cervical Exam: A Novel and Cost-effective Approach to Teaching a Fundamental Obstetrical Skill

Introduction: This study introduces an innovative and cost-effective approach to teaching the essential obstetrical skill of the cervical exam. Traditionally, learners use basic cervical dilation boards, which fall short in several critical aspects of training. They do not adequately teach cervical effacement, fetal position, or offer an accurate simulation of identifying the cervix. To address these limitations, we have developed a practical and versatile model that can be easily and cost-effectively constructed.
Methods: We first reviewed the literature to familiarize ourselves with other models that have been developed previously. We found six existing models created to address these shortcomings and evaluated each model individually based ease of construction, cost, skills tested, and durability. Using this data, we identified areas for improvement and model with items easily found at grocery and discount stores. Once a model was created, medical students, residents, and attending physicians participated in a workshop to test the models. A questionnaire was given to participants to assess their experience.
Results: Feedback was overall positive with participants reporting increased confidence in performing a cervical exam. Users also had positive feedback regarding the model's cost-effectiveness and versatility. Conclusions: Our model presents a novel approach to obstetrical training that has the potential to influence and benefit various programs and institutions within the healthcare and medical education sectors. Our innovative training model offers medical schools and residency programs a cost-effective and versatile solution for teaching cervical exams. By incorporating this approach into their curriculum, institutions can enhance the preparedness of medical students and residents in obstetrics, ultimately improving the quality of care provided to expectant mothers.

NIIANG MUNG, MD; TARRAH MITCHEL, PHD; TREVINO, NANCY, PHD; WAKEFIELD, SARAH, MD

Tedim Chin Translation of the Generalized Anxiety Disorder-7 (GAD-7) Scale: A Screening Tool for Anxiety Symptoms

Introduction: The US received its largest population of refugees from Myanmar in 2018. Since then, the COVID-19 pandemic, followed by a coup d'état and civil war that began on February 1, 2021, resulted in many seeking refuge in other countries. Song & Theichholtz (2023) write that systematic reviews show prevalence estimates of mental health disorders for refugee population vary, from 20-80%, specifically, 4-40% for anxiety. While refugee and asylum seekers may be hesitant to seek mental healthcare, clinicians can play a vital role in advocating for their access to mental health care. This article aims to translate the Generalized Anxiety Disorder-7 (GAD-7) Scale for use in Tedim-Chin, a dialect of the Chin language (Zopau).
Methods: Forward translation of GAD-7 was completed by two translators, then compared by a third translator, synthesized into one, and back translated into English by two other translators, then reviewed by a committee and synthesized into one, which was pilot tested via a survey with mixed monolingual/bilingual sample of 40 individuals at a conference attended by people from all over the US. Participants, all adults, speak Zopau fluently. The 10- item survey asked to rate clarity of the translated GAD-7 assessment.
Results: Of the 40 survey responses, all except one of the items were considered clear, (threshold for “Clear” 20% or less responses stating it is confusing). One item, question 5, was considered confusing (threshold for “confusing” >20% responses selecting that option).
Conclusions: This translation of the GAD-7 into Tedim Chin using the vigorous translation process as described above. However, more research is needed to determine reliability and validity, for use in research and clinical studies.

AUSTIN PATTERSON, DO; JENNIFER MITCHELL, MD; STEPHEN FLORES, MD; TRAVIS WINSTON, MD

Tua Part Two

Posterior hip dislocations are uncommon and classically thought of occurring in the setting of a motor vehicle accident secondary to the impact of the dashboard on a flexed hip. This is a case report of 15 yo male high school football player who suffered a posterior hip dislocation. The opposing player forced him to the ground, creating a “pop” and the inability to move his right lower extremity. The player was initially seen in a prone position alerting the sideline medical staff to immediately evaluate the player. A broad differential was used when approaching the athlete including c-spine injury, cardiac arrest, concussion, fracture, or dislocation. Initial assessment of the player demonstrated he was oriented and able to verbalize the area of his discomfort to his right hip. After confirming there was no cervical spine trauma the patient was log rolled to a supine position where his right lower extremity was found to be adducted, internally rotated, and shortened. A neurovascular exam was intact. The patient was transferred urgently to a local hospital via ambulance. The ED and Orthopedic providers were notified prior to the patient's arrival. The patient was then evaluated with right hip x-rays demonstrating a right posterior hip dislocation with an associated posterior wall acetabulum fracture. The patient was then placed under conscious sedation and the hip was reduced. A neurovascular exam was performed post reduction. Post reduction x-rays showed successful reduction of the right hip followed by a CT scan demonstrating a single displaced fragment of a posterior wall acetabulum fracture. Open reduction internal fixation of the associated acetabulum fracture was performed. After 24 hours of observation the patient was discharged home non weight bearing with follow up in 2 weeks. Patient will progress with physical therapy with expected full return at 6 months.

MARY SCHEERER, MD; KELLY KLEIN, MD

Length of Stay for Patients, Before and After Hospice Admission

Length of stay (LOS) for hospitalized patients is always in the forefront of hospital administrators and leadership's minds. Longer length of stays can cause unintended consequences such as hospital acquired illnesses and pressure injuries. One service to reduce length of stay for terminally ill patient is home hospice.
Method: This is a case study of one home hospice agency's delivery of services to two patients.
Results: This poster presentation will present a visual representation of hospice patients who had multiple admissions and long length of stays at the end of their life due to their terminal illness, who once home on hospice had no further hospital administration. In addition, these patients also received good and quality care by the home hospice nurse as demonstrated by total daily nurse visits per month and treatment of severe infections.
Conclusion: Research has shown that the older and more critically ill patients, have a longer length of stay, particularly in the critical care unit. Interventions to reduce LOS are implemented; however, this does shift patient care from inpatient to outpatient and home services.

DAMLA YAGMUR, MD, JENNIFER WARD, MD, AMY NORBURY, NP, JOHN CULBERSON, MD,

History of Standing Orders in Nursing Homes and Post-Acute Rehabilitation Facilities: A Review of Literature

Introduction
Standing orders are a pre-written set of standardized medical instructions that nursing staff at nursing homes and acute-post rehabilitation facilities must adhere to. These orders are critical for the symptomatic treatment of common complaints such as pain, insomnia, nausea, and constipation in elderly and disabled patients, both frail demographics requiring attentive care. Nursing staff are responsible for implementing standing orders, and ensuring comprehension of the orders is essential. Properly executing these orders can significantly improve the quality of care provided to patients. Therefore, it is crucial to identify and address any challenges that may arise while implementing standing orders. The purpose of this poster is to present the prior research on this subject and to highlight any obstacles encountered in patient care for future studies.
Methods
We searched PubMed for articles in English and excluded those without full-text access. Search subjects included: 1) Scope of standing orders, 2) Use of standing orders in nursing homes, and 3) Use of standing orders in long-term care facilities. Our keywords included "nursing home," "post-acute rehabilitation," "long-term care facility," "standing order," "nurse-initiated," and "nursing order." We screened 567 articles and included 24 relevant articles dating between 1978 and 2023.
Discussion and Conclusion
Beers Criteria to prevent inappropriate medication prescriptions revolutionized elderly patient care. One of the most important aspects of their work was utilizing multidisciplinary effort. Literature dating back half a century reveals efforts by nurses, pharmacists, administrative workers, and physicians. In developing and optimizing standing orders, holding onto that multidisciplinary approach is still essential. Pain, insomnia, nausea, constipation, diarrhea, delirium, falls, and wound care are common themes in elderly resident care in nursing homes, and there is plenty of room for improvement still. Through this poster, we intend to showcase the previous work done on standing orders and the difficulties faced by nursing staff while implementing them. We intend to identify areas needing improvement and contribute to the advancement of caring for the geriatric population.

BAILEY ZEILER, MD; ANN MCGINNIS; MELISSA PIEPKORN, MD

Retinopathy of Prematurity and Hospital Dynamics - A Novel QI Initiative

Introduction: Retinopathy of prematurity (ROP) is a leading cause of childhood blindness in the US. Screening and treatment require a pediatric ophthalmologist specially trained to perform dilated retinal exams and carry out treatment as indicated. All babies <30 weeks gestation or <1500g at birth should be screened at regular intervals until maturation of the retina is complete. Exams entail coordination between the ophthalmologist, neonatologist, and the nursing staff in the NICU. Delays at multiple points can lead to inefficiency, suboptimal coordination, and ultimately pull providers/staff away from other patients and duties. This affects the care and safety of ROP patients, as well as other patients. The healthcare system also suffers financial losses when physician workflow comes to a halt. Our project will measure these performance gaps and determine if our intervention improves them.
Design/Methods: Charge nurses and ophthalmologists filled out tracking sheets for each ROP exam day. Interventions included ophthalmologist communication, designated nurse for exams, and completion of demographic form the night prior. 3-months of both pre- and post-intervention data was collected.
Results: 48 exams were included in the pre-intervention data and 47 exams in the post-intervention data which showed our ophthalmologists spent an average of 9.27 and 11.43 minutes per exam respectively (p-value 0.082). Pupils were adequately dilated 81% of the time pre-intervention and 100% post-intervention (p-value 0.026). Demographics were completed nearly 100% in both groups.
Conclusion: Prior to this study, there was no literature on optimal coordination of ROP exams between healthcare teams. Our study measured average ophthalmologist exam time and identified areas with improvement potential. Our intervention showed statistically significant improvement in adequate dilation. Future studies are needed to investigate methods to improve performance gaps of ROP exams in the NICU.

Postdoctoral and Non-Faculty Researchers

***KA. AKTER1, S. SHARMA1, Y. ZHANG1, TJ. ABBRUSCATO1**

Metformin ameliorates the neuroinflammatory environment for neurons and astrocytes during in-vitro and in-vivo stroke and tobacco smoke chemical exposure: Role of Nrf2 activation

Introduction:
Neuroinflammation, which can also be accompanied by increased cerebral cytokine production, has a significant impact on the pathogenesis of many neurological illnesses, including loss of BBB integrity and ischemic stroke, yet effective treatment choices are currently lacking. Although little is known about metformin (MF), a commonly prescribed first-line antidiabetic drug, prior research suggested that it may be useful in preventing BBB deterioration and the increased risk of stroke caused by tobacco smoking (TS). Hence, the present study was designed to explore the potential role of MF against stroke and TS-induced neuroinflammation.
Methods:
Primary neurons and astrocytes isolated from mouse brains were exposed to OGD/R and TS extract and pretreated with MF. Cellular total reactive oxygen species (ROS) was measured in primary neurons using CM-H2DCFDA as a probe. The level of pro-inflammatory and anti-inflammatory cytokines was measured in primary neurons and astrocytes by RT-PCR and in the brains of adolescent mice through an immunobead assay. Western blot analysis evaluated the expression of antioxidative markers (NRF2, NQO1, and HO-1) and that of the proinflammatory modulator NF-κB. Nicotine and cotinine concentrations were measured through LCMS.
Results:
Our studies revealed that MF suppressed the release of pro-inflammatory mediators like TNF-α, and IL-1β by targeting the NF-κB signaling pathway in primary astrocytes and neurons. MF also upregulated anti-inflammatory mediators, such as IL-10, and IL-4 by upregulating the Nrf2-ARE signaling pathway. Adolescent mice receiving MF along with TS also showed a significant decrease in NF-κB expression compared to the mice not treated with MF and significantly decreased the level of TNF-α, IL-1β, MCP-1, and MIP-2 and increased the levels of IL-10 and IL-4 through the activation of Nrf2-ARE pathway.

Conclusion:
These studies support that MF could be an excellent candidate drug for the treatment and or prevention of TS-induced neuroinflammation and ischemic stroke.

The work was supported by R01NS117906.

CHRISTIAN BUSTAMANTE; BRENT R. KISBY; OLGA PONOMAREVA; YURI BLEDNOV; R. DAYNE MAYFIELD; ROBERT O. MESSING; R. ADRON HARRIS; IGOR PONOMAREV

INNATE IMMUNE ACTIVATION BY TLR3 AGONIST, POLY(I:C), IN MICE RESULTS IN ESCALATION OF ETHANOL INTAKE AND CHANGES IN GENE EXPRESSION IN BRAIN REWARD REGIONS

Introduction: Chronic high ethanol drinking is one of the characteristics of Alcohol Use Disorder (AUD). Innate immune activation by TLR receptor agonists has been shown to be associated with excessive alcohol consumption in mice. We hypothesize that innate immune activation causes cell type-specific changes in gene expression in brain reward regions and some of these changes may drive excessive drinking. The goal of this project was to identify genes associated with the activation of the innate immune system and which are associated with excessive drinking in mice.
Methods: We used C57BL/6J (B6J) male mice as a model of AUD. Animals were randomly assigned to receive repeated injections of Poly(I:C) (PIC), a TLR3 agonist, or repeated saline injections. Animals were allowed to choose between alcohol or water every other day (18 dinking sessions). Animals were assigned to one of four groups: saline/water (SW), saline/ethanol (SE), PIC/water (PW), and PIC/ethanol (PE). Brains were harvested at three different timepoints, and bulk RNA-seq was performed within six brain regions associated with drug reward. Subsequently, differentially expressed genes (DEGs) were identified using an in-house bioinformatic pipeline. Deconvolution of cell types was performed using a scRNA database of the Allen Brain Atlas.
Results: Repeated PIC injections resulted in escalation of ethanol consumption in the PE group compared with SE animals. None of the samples were identified as outliers. At least 900 DEGs were found for each of the six regions when PE and SE groups were compared after chronic exposure. In all brain regions, upregulated DEGs were significantly associated with endothelial cells and microglia. On the other hand, downregulated DEGs were associated with neurons.
Conclusions: These findings suggest that neuroimmune activation, triggered by PIC, leads to the excessive alcohol consumption in B6J male mice, and the DEGs identified are mechanistic targets for this intake increase.

ASHLY HINDLE; SHANE C. SMITH; JAKE STRICKLAND; ADAM BAKER; ISABEL GUZMAN; SHARDA P. SINGH; J. JOSH LAWRENCE; CHHANDA BOSE

Vitamin A and Histone Deacetylases in Alzheimer's disease

Introduction
In Alzheimer's disease (AD), histone acetylation is disrupted, suggesting impaired transcriptional control. Moreover, evidence suggests an AD-dependent loss of transcription controlled by all-trans-retinoic acid (ATRA), a bioactive metabolite of vitamin A (VA). Antioxidant depletion causes oxidative stress (OS), triggering Nrf2-mediated antioxidant defenses. Here, we investigated roles of VA, histone acetylation, Nrf2, and OS in vitro. Finally, we established a dietary vorinostat dose that promotes histone acetylation in AD mouse brain.
Methods
For in vitro studies, mouse HT22 cells were treated with vorinostat (up to 40 μM), ATRA, and/or H2O2. MTT and lipid peroxidation assays were performed. Acetyl-histone H3 and Nrf2 levels were examined via western blot (WB) and immunocytochemistry (ICC). For in vivo studies, humanized amyloid beta knock-in (hAbeta-loxP-KI) AD mice were fed purified diet with 0.18 or 0.36 mg vorinostat/gram of diet for 2 weeks. HDAC enzyme activity in brain tissue was examined via colorimetric ELISA and acetyl-histone H3 level.
Results
Vorinostat and ATRA treatment (up to 20 μM) caused no significant cytotoxicity to HT22 cells. H2O2 alone (25-50 μM) caused ~30-40% cell death ($p<0.0001$). ATRA (5 μM), in combination with vorinostat (0.5 μM), protected against H2O2 up to 150 μM. Vorinostat increased acetylation of histone H3 with 0.5-3.0 μM treatment for 24h ($p<0.001$). ROS was significantly reduced. Nuclear translocation of Nrf2 was induced by H202 and reduced after ATRA and vorinostat treatment. Both vorinostat diets increased acetyl-histone H3, inhibited HDAC activity, and reduced peroxidation ($p< 0.05$).
Conclusions
Doses of vorinostat used in vitro and in vivo increased histone acetylation without cytotoxicity/toxicity. In vivo, 0.18 mg/g vorinostat diet delivered a tolerable and bioactive dose. VA, alone and in combination with vorinostat, may protect neuronal cells from oxidative stress. Together, our study provides a possible link between oxidative stress, Nrf2 and HDACs as potential contributors to AD progression.

OLUGBENGA OLOKEDE, MPH, MD, CATHERINE HUDSON, MPH, GIPSY E. BOCANEGRA, PHD, BILLY U. PHILIPS JR., PHD, MPH

Understanding the choice of healthcare profession by college students in West Texas

INTRODUCTION

Many parts of West Texas are designated Healthcare Professional Shortage Areas (HPSA) due to a number of factors including rurality.1 One way to address this challenge is to increase the number of rural students who choose a healthcare profession as a career.2, 3 These students are most likely to practice in a rural community. This study seeks to examine factors that influence a student's choice of a healthcare profession.

We hypothesize there are certain behavioral and environmental factors, such as encouragement from parents and teachers, high school grades and experiences, that influence a student's choice to pursue a healthcare profession. We also hypothesize that those factors influence the choice of a rural area to practice after the completion of their respective programs.

METHODS

A survey study was conducted among first year TTUHSC students from regional campus sites. A concerted attempt was made to represent in the sample students who lived continuously in rural and urban location in west Texas to reflect rural background. We hoped to see a correlation between a rural background and the intention to practice in such a setting at the completion of education and training.

RESULTS

A total of 116 responses were collected, 36.2% were male and 62.9% female. 41.2%, 2.6%, 20.2%, 28.0%, and 7.9% are from Schools of Medicine, Nursing, Pharmacy, Health Profession, and Graduate School of Biomedical Sciences respectively. Of the respondents, 43.4% and 56.6% are from rural and urban areas respectively, and 29.8% intend to practice in rural areas and 70.2% intend to practice in urban areas. Based on preliminary analysis, rurality was a factor that led to the intention to practice in rural areas.

CONCLUSION

The results obtained from this study are intended to increase the number and percentage of high school students who choose healthcare as a profession and practice in rural West Texas.

DR. MURUGANANTH KUMAR RAJU, PHD; SAYANIKA DUTTA, MSC; DR. GIRIJESH PATEL, PHD; HAMED KHEDMATGOZAR, MS; DANIEL LATOUR, BS; JONATHAN WELSH, BS; DR. MANISHA TRIPATI, PHD; DR. SRINIVAS NANDANA, PHD.

A TBX2-driven signaling switch from androgen receptor to glucocorticoid receptor confers therapeutic resistance in prostate cancer

A TBX2-driven signaling switch from androgen receptor to glucocorticoid receptor confers therapeutic resistance in prostate cancer
Background: Recent research reveals that glucocorticoid receptor (GR) activation induces enzalutamide resistance in advanced prostate cancer (PCa) by bypassing androgen receptor (AR) signaling, yet the underlying molecular mechanisms remain elusive. Our previous findings identified TBX2, a T-box transcription factor, as overexpressed in castration-resistant PCa (CRPC). Recent reports confirm TBX2 and GR as key drivers of enzalutamide resistance. Our study elucidates TBX2's role as a molecular switch, repressing AR levels while activating GR expression, thus substituting AR signaling and promoting tumor growth.
Methods: We genetically modulated TBX2 using multiple approaches: a) dominant negative, DN, to block TBX2 (TBX2DN), and b) overexpression, OE, to increase TBX2 expression (TBX2OE), c) shRNA mediated knockdown (shTBX2). RNA-seq, qRT-PCR, Western blot and IHC were performed. Further, we used ChIP, SDM and Co-IP was used.
Results: TBX2 binds to AR and GATA2 promoters, exerting bimodal repression on AR expression. Conversely, TBX2 upregulated GR via direct GR promoter binding and protein-protein interaction. Together, concurrent repression of the AR and activation of GR resulted in enzalutamide resistance. Notably, SP2509, an LSD1 inhibitor, disrupts TBX2-LSD1 and TBX2-GR interactions, revealing a novel mechanism for SP2509 in CRPC. Our findings support a model where TBX2, LSD1 and GR proteins interact, and pharmacological inhibition of LSD1 impedes the TBX2-driven AR-to-GR switch by disrupting TBX2-GR interaction.
Conclusions: In summary, our study identifies TBX2 as the molecular switch that drives the AR to GR signaling bypass thereby conferring enzalutamide resistance. Further, our study provides key insights into a potential therapeutic modality for targeting the AR to GR signaling switch via disruption of the TBX2-LSD1 and TBX2-GR protein-protein interactions.

Research Aides

KINSEY RICH, NATHALY COMIER, ASHA WORSHAM, DANIEL HARDY

SMA20/PMIS2 is a rapidly evolving sperm membrane alloanti- 2 gen with possible species-divergent function in fertilization

Many sperm-specific proteins are known or suspected to function in mammalian fertilization events, from transport in the female tract to fusion with the egg plasma membrane. Nevertheless, it is unclear whether past studies had collectively identified all, most, or only some of the key proteins that mediate fertilization. Here we report molecular analyses of a newly discovered sperm-specific membrane alloantigen, SMA20. BLASTp search with the protein sequence deduced from the major ORF of an SMA20 cDNA cloned from pig testis retrieved no match from the pig genome, but did retrieve a 99% match to the Pmis2 gene product in warthog. Sequence identity to predicted PMIS2 orthologs from 86 species of placental mammals ranged from no more than 80% overall in Cetartiodactyla to less than 60% in Primates, with an N-terminal, alanine– and proline–rich region showing the highest divergence including, in the extreme, its absence in most rodents, including mouse. Gene name search retrieved the annotated Pmis2 locus between Haus5 and Atp4a in genomes of 86 placental mammals, but retrieved Haus5, Atp4a, and Gapdhs from 376, 294, and 373 species, respectively. To search for overlooked Pmis2 orthologs, we surveyed genomes of 20 randomly chosen placental mammals lacking prior annotation of Pmis2 by pairwise alignment of genomic sequences between Atp4a and Haus5 to a previously annotated Pmis2 genomic sequence, and successfully identified the gene in all 20 species. In contrast to the likely conservation of the Pmis2 locus throughout Placentalia, the same bioinformatic approach failed to identify Pmis2 loci in marsupial or monotreme species, suggesting the gene is either absent or unrecognizably divergent in these mammalian clades. We conclude that the gene encoding

sperm-specific SMA20/PMIS2 arose de novo in Eutheria after divergence from Metatheria, whereupon rapid molecular evolution likely drove acquisition of species-divergent function unique to fertilization in placental mammals.

SHANE SMITH; ASHLY HINDLE; MATTHEW HERNANDEZ; ADAM BAKER; JAKE STRICKLAND; JOCELYN MEDINA; J. JOSH LAWRENCE

RARE-LacZ Mice as a Model to Study Retinoic Acid Signaling at Cellular Resolution in Alzheimer's Disease

Introduction: Disrupted amyloidogenic/non-amyloidogenic balance leads to Alzheimer's disease (AD). Evidence suggests vitamin A (VA) supplementation favors the non-amyloidogenic pathway through upregulation of α-secretase. Originally used to map embryonic retinoic acid (RA) signaling, RARE-LacZ mice possess multiple LacZ genes controlled by retinoic acid response elements (RAREs). We crossed RARE-LacZ mice with AD mouse models to determine their suitability for studies into the effects of VA on dentate gyrus (DG) RA signaling and learning in AD. Methods: Relative LacZ gene copy ratio was determined by qPCR. Dietary intervention compared VA-supplemented (20 IU/g) AIN-93M to standard (4 IU/g). Mice were tested at postnatal day (P)125 via water T-maze (WTM, 9 simple discrimination, 9 reversal trials). PFA-fixed sections (40μm) were immunostained for LacZ, doublecortin, and/or calbindin, confocally imaged, and analyzed using ImageJ. Results: RARE-lacZ mice were crossed with C57BL/6J, -NJ, and CD1 mice (wildtype strains of J20, hAβ-KI, and RARE-LacZ mice, respectively). LacZ gene copy ratio was ~2.6:1 between RARE-LacZ mice (N=12) and crosses (N=34). 32/34 offspring fell within ±50% of the mean. Strain affected latency to platform on WTM during simple discrimination and reversal (N=11-12, $p<0.05$, Friedman), however total distance traveled was unaffected suggesting intact learning in all backgrounds. Hippocampal LacZ immunoreactivity was localized to a subset of mature doublecortin-negative, calbindin-positive DG granule cells, appearing higher on C57BL/6J and -NJ than CD1 backgrounds. Offspring from J20+/- AD and RARE-LacZ mice exhibited impaired learning (N=16, $p<0.05$, Kolmogorov-Smirnov). No significant differences in behavior between VA-supplemented and standard AIN-93M were observed. Conclusions: RARE-LacZ mice appear to have behavioral and genetic characteristics appropriate for testing VA-mediated interventions in AD models. RA signaling is prominent in mature DG cells associated with successful reversal learning. Although reversal of AD-related learning deficits by VA supplementation was not observed, testing AD mice on a VA deficient (0.4 IU/g) diet is planned.

ASHA E. WORSHAM, EMMA K. ROBERTS, EMILY A. WRIGHT, ROBERT D. BRADLEY, AND DANIEL M. HARDY

Zan TIL+E domain duplication and divergence reflect unique evolution of a speciation gene in muroid rodents

The speciation gene Zan encodes zonadhesin, a large, mosaic protein in the sperm acrosome that promotes reproductive isolation by conferring species-specificity to sperm-egg recognition. In Mus musculus, progressive duplication of a two-exon cassette produced a dramatic expansion of 20 tandem TIL+E domain repeats that are absent in non-rodent species. Because Zan molecular evolution contributes directly to species divergence, we tested whether the ontogeny of TIL+E repeat expansion reflects phylogenetic relationships in Rodentia. Genome screens retrieved TIL+E repeats only from Suborder Myomorpha. The number of repeats ranged from zero in the most primitive species examined, Jaculus jaculus (Superfamily Dipodoidea), to 24 in Peromyscus spp. (Superfamily Muroidea). Within Muroidea (mice, rats, hamsters, gerbils, lemmings, and voles), the number of repeats reflected species richness of taxa at the more terminal branches of the rodent phylogeny, with 20-24 repeats in Peromyscus and Mus, 15-17 in Microtus, yet only nine in Nannospalax. Phylogenetic analysis of >600 Zan TIL+E DNA sequences identified 10 supported inter-species groupings that broadly included nearly all examined members of the families Cricetidae and Muridae in Muroidea, as well as three novel groupings specific to murid species, reflecting divergent evolution within and between the groups. Positions and sequential arrangement of inter-species groupings indicated that duplication progressed from the 5' end of the expansion, with more primitive domains pushed downstream. In contrast, the single available gerbil species (Meriones) provided a striking example of reciprocal monophyly, evident as intraspecies grouping of 18 tandem TIL+E repeats, likely reflecting concerted evolution by gene conversion. We conclude that ancestral exon duplications in Muroidea generated tandem TIL+E repeats that served as raw material for species divergence of Zan by multiple modes of molecular evolution, and ensuant selection for a contribution to species-specificity of fertilization promoted the extraordinary adaptive radiation of Rodentia.

Undergraduate

LAUREN CONGER, YUVAL WEIGL, KERRI SPONTARELLI, KAZUHIRO ABE, ORIT REISH, LILACH BENYAMINI AND PABLO ARTIGAS1

A new ATP1A1 variant associated with a novel disease phenotype.

Pathological variants of ATP1A1, coding for the Na+,K+-ATPase (NKA)-α1 subunit (an αβ heterodimer), are known to cause hyperaldosteronism, Charcot-Marie-Tooth neuropathies, hypomagnesemia with seizures and cognitive delay, as well as a group of phenotypes characterized by seizures and developmental delay. We found an ATP1A1 variant ("Variant X") in a patient with hypothyroidism, congenital heart defects, obstructive hydrocephaly, conductive hearing loss, upper motor neuron symptoms, autism, and global developmental delay. NKA hydrolyzes 1ATP molecule to export 3Na+ out of the cell while importing 2K+, establishing electrochemical gradients that power excitability and secondary active transport in most cells. Previous studies have reported functional characteristics of the NKA-α1 variants that may contribute to their particular phenotypes, invariably showing loss of NKA function and, in some cases, aberrant ion-channel-like functional characteristics. To identify plausible mechanisms for the novel phenotypes observed in the patient, we expressed mutant and human wildtype and mutant NKA-α1 with β1 in Xenopus oocytes, as well as in HEK293 cells for ATPase assays and structural analysis following protein purification. Compared to wildtype, Variant X causes loss of NKA function, as indicated by a ~90% reduced K+-induced NKA current in two-electrode voltage clamp (TEVC, n≥11) and reduced maximal ATPase activity in purified protein. Despite similar protein levels in Western blots from plasmalemma enriched preparations (n=2), the ouabain-sensitive partial reactions (charge movement elicited by voltage pulses in the absence of external K+ show a ~90% reduction of the total charge moved (n≥8), indicating reduced numbers of functional pumps at the plasmalemma. To evaluate Variant X-NKA localization, functional CFP- and YFP-tagged α1 were expressed in HEK293 cells for fluorescent microscopy. Variant X appears to localize in vesicles near the plasma membrane. Evaluation of plausible functional or trafficking dominant-negative effects is underway.

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ANNMARIE FARAG; ANDREW IBRAHIM, BS; VIVIE TRAN, BENG; MINNIE TRAN; DR. EZHUMALAI MUTHUKRISHNAN, PHD; DR. KUMUDA DAS, PHD

Effects of Hyperglycemia on Mitochondrial Structure and Functionality of Mitochondrial Proteins MFN2, UCP2, and DRP-1

Introduction:
Diabetes mellitus is a chronic health condition that affects millions. Hyperglycemia associated with diabetes has been shown to cause mitochondrial dysfunction. However, it is still unclear how hyperglycemia affects endothelial cells and their mitochondrial metabolism.
Many proteins that govern the dynamic process of mitochondrial fusion and fission have been identified. MFN2 controls fusion of fragmented mitochondria; UCP2 lowers mitochondrial oxidative stress; and DRP1 promotes mitochondrial fission. To better prevent mitochondrial dysfunction in diabetics, this study investigates the effects of hyperglycemia on the expression of mitochondrial proteins mitofusin 2 (MFN2), uncoupling protein 2 (UCP2), and dynamin-related protein-1 (DRP-1).
Methods:
To induce hyperglycemia, coronary artery endothelial cells were cultured in: (1) control media; (2) 5mM glucose media; (3) 30 mM high glucose media; and (4) 6mM glucose + 24mM mannitol media for 42 hours. Western blot analysis was then performed to detect protein levels.
Results:
Expression of MFN2 (fusion protein) and UCP2 (oxidative stress protector) were both significantly decreased in all glucose-treated conditions. Namely, a larger decrease in MFN2 and UCP2 expressions was present in the higher-glucose treated conditions, as compared to the lower-glucose treated conditions. When measuring DRP1 (fission protein) levels, both total DRP1 levels and pDRP1 Ser617 (inhibitory) levels were measured. pDRP1 Ser 617 saw significant decreases in hyperglycemia, while total DRP1 levels stayed constant.
Conclusions:
The decreased expression of MFN2 and UCP2 suggests that hyperglycemia impairs the reparatory mitochondrial fusion pathway, as these two proteins are implicated in mitochondrial repair. Similarly, decreased expression of pDRP1 Ser617, an inhibitory phosphorylation of fission-protein DRP1, implies that hyperglycemia decreases inhibition of mitochondrial fission. Thus, we find that hyperglycemia impairs mitochondrial repair and encourages fragmentation.

BOVEY LIU; PEYTON PRESTO; DR. MARIACRISTINA MAZZITELLI; DR. IGOR PONOMAREV; DR. VOLKER NEUGEBAUER

The role of amygdala lateralization and sex on pain-like behaviors following exogenous neuroinflammation

Chronic pain is a debilitating condition affecting roughly one in five adults in the U.S. Despite this, neural mechanisms of pain are not fully understood. One brain area that has become a focus of pain research is the amygdala, a bilateral limbic structure implicated in the emotional dimension of pain. Specifically, the central nucleus of the amygdala (CeA) in the right- rather than left-hemisphere has been linked to pain behavior and pain modulation. In this study, we examined functional lateralization of the CeA as well as sex differences in the context of neuroimmune-signaling and pain. Two potent immunostimulants – lipopolysaccharide (LPS), a toll-like receptor 4 (TLR4) agonist; or polyinosinic-polycytidilic acid (poly I:C), a known viral mimetic and TLR3 agonist – were used to probe this neuroinflammatory state compared to vehicle control (artificial cerebrospinal fluid, ACSF). We hypothesized that exogenously-induced neuroimmune activation within the right but not left CeA would produce pain-like behaviors. LPS, poly I:C, or ACSF was stereotaxically delivered directly into either the left or right CeA of male and female rats. 3- or 7-days post drug delivery, sensory thresholds (von Frey test) and emotional-affective responses (vocalizations in response to a noxious stimulus) were measured. LPS but not poly I:C produced an increase in mechanosensitivity compared to ACSF in both sexes at both time points, regardless of hemisphere. At the 3-day time point, LPS but not poly I:C produced an increase in ultrasonic vocalizations in both sexes and both hemispheres; however, at the 7-day time point, both LPS and poly I:C produced an increase in ultrasonic vocalizations that was specific to the right CeA. The results suggest that while exogenous activation of TLR4-related neuroimmune mechanisms in either CeA can generate sensory behaviors, exogenously-induced emotional-affective responses may incorporate TLR3-based mechanisms at a later stage that is specific to the right hemisphere.

JOCELYN MEDINA, MATT HERNANDEZ, ADAM BAKER, ASHLY HINDLE, AND J. JOSH LAWRENCE

Visualizing retinoic acid signaling in dentate gyrus granule cells and spatial relationships with parvalbumin-positive circuit elements

All-trans retinoic acid (ATRA), a bioactive metabolite of Vitamin A, plays a pivotal role in oxidative stress, mitochondrial function, and amyloid beta (Ab) production. Our goal is to establish that ATRA depletion contributes to the progression of Alzheimer's Disease (AD). RARE-lacZ mice express beta-galactosidase (lacZ) under the control of retinoic acid response elements (RAREs). We acquired homozygous RARE-lacZ mice, a reporter model that could be crossed with AD mouse models. Our first goal was to visualize lacZ-positive cells at single cell resolution. Consistent with a previous study demonstrating X-Gal staining, we employed anti-LacZ immunohistochemistry in free-floating 40 µm-thick hippocampal slices. Virtually all lacZ-positive neurons in the dorsal and ventral hippocampus were an unidentified subset of dentate gyrus granule cells (DGGCs). To identify the maturation state of LacZ-positive DGGCs, we performed LacZ double-labeling with calbindin or doublecortin antibodies. LacZ colocalized with calbindin but not doublecortin, confirming the identity of LacZ-positive cells as mature DGGCs. Fast-spiking parvalbumin (PV) interneuron impairment has been linked to neuronal network dysfunction and cognitive decline (i.e. Hijazi et al. 2023), but the spatial relationship to ATRA signaling remains unclear. Therefore, we also performed LacZ double-labeling with an anti-PV antibody in both hippocampal and medial septum (MS) slices. PV expression was robust in both hippocampus and MS, though we observed no obvious colocalization of lacZ in hippocampal or MS PV interneuron types. However, PV-positive synaptic puncta were frequently observed in apposition with LacZ-positive DGGC soma and dendrites, suggesting innervation by DG PV interneurons. In conclusion, we find that ATRA signaling is restricted to a subset of calbindin-positive DGGCs which may be innervated by PV-positive synaptic terminals. As PV neuron dysfunction and ATRA deficiency have been implicated in AD, these results provide new insights into spatial relationships between this newly discovered DGGC subtype and PV neurons.

DAKOTA ROBISON; FLÁVIA SARDELA DE MIRANDA; DALIA MARTINEZ-MARIN; GEETHA PRIYA BOLIGALA; NICHOLAS WAGNER; KEVIN PRUITT, PH.D.; KARLA DANIELE, M.D.; RAKHSHANDA LAYEEQUR RAHMAN, M.D.; MICHAEL W. MELKUS, PH.D.; SHARDA P. SINGH, PH.D.

The ELISpot assay to evaluate abscopal effect post-breast cancer cryoablation for Triple Negative Breast Cancer.

Introduction: Standard of care treatment for breast cancer (BC) is lumpectomy with adjunctive therapy, which is not ideal for every patient. Cryoablation, a less invasive out-patient procedure circumvents surgery by killing the tumor through rapid freezing and thawing cycles in vivo. The procedure is approved for low-risk BC and is currently being leveraged for high-risk BC. One benefit of cryoablation is the potential abscopal effect - the anti-tumor T cell immune response targeting distant metastatic tumor cells. Currently, there is no defined methodology to measure this effect. The aim of this project is to develop the ELISpot assay to measure cryoablation induced anti-tumor specific T-cell responses using IFN-γ as the readout.

Methods: 4T1-12b-luc mouse mammary carcinoma cells were bilaterally injected into the mammary fat-pad of BALB/c mice. After two weeks, the mice were divided into two groups and underwent resection or cryoablation of the left tumor. One week later, the mice were sacrificed and splenocytes and peripheral blood mononuclear cells (PBMCs) were isolated from both groups and evaluated for anti-tumor T cell specificity by challenging with abscopal tumor cells or cultured 4T1 cells via the ELISpot assay.
Results: Quantification of the ELISpots found both cryoablation and resection developed anti-tumor specificity with a stronger response to tumors compared to in vitro cultured 4T1 cells. When comparing splenocytes and PBMCs challenged with tumor cells, both treatment responses were similar to each other and to tumor cells alone. This suggests the observed immune responses measured likely were derived from tumor infiltrating lymphocytes within the tumors.
Conclusion: The ELISpot assay will be a valuable tool to evaluate anti-tumor T cell immune responses following cryoablation. To improve the assay, tumor cells will be isolated independently from tumor infiltrating lymphocytes (TILs) before performing the ELISpot assay for a more accurate assessment of the abscopal effect.

JORDAN N SANCHEZ, ABDUL A SHAIK, PRANEETHA PANTHAGANI, SUSAN E BERGESON

BCS Classification of Butyl Ether Minocycline for Oral Drug Products

The study explores the pre-clinical development of 10-butyl ether minocycline (BEM) as a treatment for alcohol use disorder (AUD), a prevalent chronic disease associated with comorbidities and a major risk factor for premature death or disability. Our lab demonstrated the pre-clinical efficacy of minocycline and its derivative, BEM, in significantly reducing alcohol consumption in rodent and swine models. Long-term use of minocycline for AUD risks disrupting the gut microbiome and development of antibiotic resistance. Among 17 derivatives, BEM was chosen for its safety, efficacy, and lack of anti-microbial activity. Our goal is to study BEM's physiochemical properties and efficacy to facilitate FDA approval process. The efficacy of BEM was tested in both female and male C57BL/6J mice using a drinking-in-the-dark (DID) paradigm and observed a dose-responsive and significant reduction in alcohol consumption. In preclinical development, assessing physicochemical characteristics and target identification is crucial. BEM's dissociation constant (pKa) was predicted using 'Marvin' software and confirmed by UV spectroscopy. BEM has three pKa values within the range of 5-8, suggesting that most absorption happens in the gastric environment. The partition coefficient (log P) of BEM (measured at 0.77 using the shake-flask method) aligns with the concentration of the drug in the brain relative to plasma. In vitro permeability assays by Xenotech further confirmed BEM's high permeability. Moreover, solubility studies indicated BEM is highly water soluble, classifying it as Biopharmaceutical Classification System (BCS) Class-I, ideal for oral drug development. BEM's effect on MMP-9 and microglial activation was evaluated as these mechanisms were identified to be altered in AUD. Colorimetric assays confirmed dose-dependent MMP-9 inhibition, while western blot analysis showed significant reduction in Iba1 expression (marker for microglial activation), surpassing minocycline. These findings collectively suggest that there is a promising avenue for further development of BEM as a therapeutic agent for AUD.

MINNIE TRAN, VIVIE TRAN, SUBASH SWARNA, ANDREW IBRAHIM, ANNMARIE FARAG, MOHAMMAD M. ANSARI, M.D

Evaluation Of The Utility Of ChatGPT Responses In Addressing The Diagnosis And Queries Related To Pulmonary Embolism

Background
Despite proven utility of ChatGPT in diverse domains, its effectiveness in addressing inquiries related to PE remains uncertain when multiple parameters are presented. Our investigation aims to evaluate the suitability of ChatGPT's responses to fundamental questions concerning PE, focusing on aspects such as risk factors, prevention, and treatment, including medication information.
Methods
To conduct this study, 15 questions were posed to ChatGPT. The queried topics encompassed risk counseling, preventive measures, and details about treatment modalities. An interdisciplinary panel comprising physicians specializing in interventional cardiology, vascular surgery, and interventional radiology reviewed the responses. The panel categorized the answers as appropriate, inappropriate, or unreliable based on their clinical expertise. Two independent teams performed the review, and the results were combined and analyzed for correctness.
Results
ChatGPT delivered appropriate responses for 11/15 questions (73.3%). However, in 4/15 questions (26.7%), the responses were deemed unreliable. These unreliable responses were characterized by a lack of comprehensive details necessary for fully addressing the questions. Questions deemed unreliable predominantly pertained to areas such as signs/symptoms and diagnostic methods.
Conclusions
This study emphasizes the potential of ChatGPT in furnishing primarily appropriate responses to inquiries regarding PE. The application of AI tools holds promise in augmenting patient understanding and quality of care in the context of PE. Nevertheless, ongoing advancements necessitate further research to comprehensively understand the role of ChatGPT. Since AI depends on initial data input, the future might hold physician teams joining to feed data that can allow them to obtain diverse interpretation.

NOAH WONG; AMBER NANNI; MINNIE TRAN; DR. KELLY MITCHELL

Increased Prevalence of Diabetic Retinopathy in Emergency Room Presentations and Correlation with Poorly Controlled Diabetes

Diabetic Retinopathy (DR) represents a progressive vision impairment disease manifested from complications of diabetes mellitus (DM), with the most severe cases leading to complete vision loss. Nearly 9.6 million Americans were diagnosed with DR in 2021, with 1.84 million having vision-threatening DR [1]. This estimation is projected to continually increase with the rampant growth of DM prevalence in the U.S. [1,2]. Consequently, more patients are presenting to the Emergency room (ER) with cases of vision-threatening Diabetic Retinopathy (DR). This retrospective study focuses on identifying correlations between patients with histories of DR and presenting diabetic risk factors in emergency room visits. Patient data was assessed in 2019 and 2022, examining the difference in DR prevalence in the ER before and after COVID-19.
In 2019, 120 unique patients entered the ER with DR, of whom 24 (20%) experienced deteriorating vision. Of these patients, 15 individuals (62.5%) had poorly managed diabetes, as indicated by A1C levels exceeding 8%. In 2022, 201 unique patients entered the ER with DR, of whom 28 (13.9%) experienced deteriorating vision. Among them, 13 individuals (46.4%) exhibited poorly managed diabetes (A1C>8%). This comparative analysis emphasizes an association between poorly controlled diabetes and the occurrence of worsening vision among DR patients presenting to the ER. Most notably, an increase of 14% in the presentation of DR was observed between the pre-COVID and post-COVID periods. In the ER, a distinct concern emerged as seven cases were identified wherein patients were newly diagnosed with vision-threatening DR. However, if detected early, DR can be more manageably treated while also reducing the risk of retinal degenerative effects, thereby averting the escalation of cases to the emergency room. Future investigations are warranted to identify the determinants contributing to the heightened prevalence of vision-threatening DR in the ER.

ISABELLA ZAMBRANO, DR. J. JOSH LAWRENCE PH.D., DR. ANDREW SHIN PH.D.

Molecular mechanisms of action of flaxseed biochemical components: relevance to the gut-brain-axis and prevention of Alzheimer's disease

Introduction: Flaxseeds have numerous dietary benefits. It is rich in fiber and omega3 fatty acid content. Moreover, flaxseed components are converted to enterolactone (ENL) by gut microbiota (GM). Alzheimer's disease (AD) affects over 6 million Americans today. AD is associated with both genetic and environmental risk factors. Diet itself plays an oversized role that can increase or reduce the onset of AD symptoms. The gut plays a role in digestion and breakdown of nutrients that in turn produce polyphenolic compounds like ENL. Flaxseeds continue to show that they are rich in polyphenols that, once absorbed in the large intestine, are converted to ENL which may have synergistically protective roles in preventing AD.
Methods: To investigate the link between flaxseed-derived ENL acting within the gut-brain axis (GBA) and AD, we reviewed multiple articles collected via PubMed.
Results: ENL was found to have numerous mechanisms of action by acting as an anti-bacterial/pro-bacterial compound in the GBA, an antioxidant, an NMDA receptor antagonist, and an acetylcholinesterase inhibitor (AChEI). Moreover, it has anti-estrogenic, anti-nitric-oxide, anti-atherosclerotic, antiproliferative, and anti-inflammatory properties. Finally, modulation by ENL and its other biochemical components can enrich "healthy" gut microbiota, which itself has nutritional benefits.
Conclusion: High ENL and fiber content are positively associated with enriched GM and the creation of symbiosis within the GBA, thereby suppressing neurodegenerative disease. Additionally, ENL's AChEI activity could be similar to AD pharmaceutical drugs (donepezil and galantamine), thereby promoting acetylcholine release and potentially cognition and learning. Flax-seed-derived lignans strengthen neural protection through myelination and microglia stabilization. These biochemical mechanisms could act synergistically within the GBA against AD. Further studies need to be performed to further elucidate the molecular mechanisms of ENL.

CHARLIE ZHANG; DR. J. JOSH LAWRENCE, PHD

Vitamin K2 in Healthy Aging and Protection Against Alzheimer's Disease Pathogenesis: Potential Mechanisms Mediated by Osteocalcin

Vitamin K2 (VK2), or menaquinone, is a vitamin abundant in animal and fermented foods but is also produced by a healthy gut microbiome. Initially discovered in 1929, Vitamin K enables the synthesis of proteins critical for blood coagulation and bone metabolism. Importantly, K2 is an essential cofactor in the regulation of osteocalcin (OCN), a hormone regulating glucose homeostasis and bone matrix composition. More recently, with the creation of OCN knockout mice, OCN has been shown to play critical roles in learning and memory. Studies have shown that OCN improved the brain's neural network function in AD mice by amplifying the power of high gamma oscillations, a brain rhythm associated with improved cognition. In addition, in one study in a mouse model of Alzheimer's disease (AD), OCN decreased the accumulation of amyloid β (Aβ) peptides, a molecule widely associated with the onset of AD. OCN-treated AD mice showed increased glycolytic activity, amplifying the pentose-phosphate pathway (PPP) which plays a pivotal role in the reduction of oxidative stress. OCN treatment in AD mice inhibited astrocyte proliferation, reduced Aβ burden, and reduced DNA damage. Notably, a natural source of VK2 is found in many fermented foods such as natto and kimchi. Given the prevalence of VK2 in East Asian diets, the increased VK2-mediated biosynthesis of OCN may contribute to improved protection from osteoporosis, cardiovascular health, and cognitive function frequently observed in aged individuals in East Asian cultures. We hypothesize that increasing VK2 sustains OCN levels and consequently maintains cognitive function in aging populations. In conclusion, VK2 shows promise as a novel and exciting treatment for reducing or preventing neurodegeneration through dietary intervention, potentially improving the quality of life of individuals at risk for or suffering from AD.

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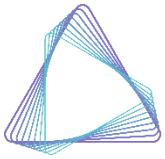

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